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A GROUP OF SPOKAN INDIANS

(Drawn from a Photograph).





THE NATURALIST
IN
VANCOUVER ISLAND AND
BRITISH COLUMBIA.

BY
JOHN KEAST LORD, F.Z.S.

NATURALIST TO THE BRITISH NORTH AMERICAN BOUNDARY COMMISSION.



THE 'KETTLE' FALLS: A SALMON LEAP ON THE UPPER COLUMBIA.

IN TWO VOLUMES—VOL. I.

LONDON:
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PREFACE.

MANY interesting and useful works have been already published relating to the Colonies of Vancouver Island and British Columbia, which, however, contain little if any information on the subject of their Natural History.

This missing link I venture in some measure to supply. But 'The Naturalist in Vancouver Island and British Columbia' is not intended to be a book on Natural History merely; neither does the Author desire to weary his reader with tedious descriptions of genera and species. Comparative anatomy and physiology can be acquired at home, but *habits* are only discoverable by those who devote themselves to the rough though

pleasant life of a wanderer, or by the actual observation of a careful investigator.

In the following pages, the Author has purposely avoided any definite system of arrangement, preferring a pleasant gossip, chatting, as it were, by the fireside about North-Western Wilds.

A detailed list of the Zoological collection made whilst Naturalist to the Government Commission will be found in the Appendix.

JOHN KEAST LORD.

LONDON: May 28, 1866.

INTRODUCTION.

BEFORE setting sail from Southampton, it may perhaps be as well to devote a few pages explanatory of the early history and discovery of Vancouver Island ; why we are going there ; and the object of the Commission to which I belong.

In the year 1587, we learn, that a Captain Cavendish, in order to repair his shattered fortunes, fitted out three ships for the purpose of plundering on the high seas. After many unsuccessful raids, we next hear of him lurking in his ship behind a spit of land, Cape St. Lucas, on the Californian coast (a prominent rocky bluff, not unlike 'the Needles,') waiting for the 'St. Anna,' a galleon freighted with rich merchandise and a hundred and twenty-two thousand Spanish dollars. She heaves in sight, little dreaming of her danger ; is pounced upon, boarded, and taken, her trea-

sure transferred to the hold of the buccaneer; the crew rowed ashore, and their ship set on fire. Death seemed inevitable, when a breeze, which soon increased to a gale, drifting the burning hull on the rocks providentially proved a means of escape, for a raft was made, and launched. Upon this the men stood out to sea.

After enduring frightful privations, a friendly ship picked them up, and they eventually reached Europe in safety. Amongst the sailors rescued from the raft was a Greek, Apostolos Valerianos, who for some reason was nick-named by his shipmates Juan de Fuca. Nine years after his escape from the raft we hear of him in Venice.

In 1596 Mr. Locke, a merchant, and his friend John Douglas, a sea-captain, were residing in Venice, and nightly smoked their pipes at a snug wine-shop, the resort of sea-faring men. A constant visitor at this house of entertainment was a pilot on the Greek seas, who had attracted Douglas's attention by the wonderful stories he related; so much so that he induced his friend, Mr. Locke, to listen to the old man's adventures.*

* For full narrative of Apostolos Valerianos, see Samuel Purchase His Pilgrims.

The story of the raft we already know. The remainder was to the effect that he entered into the service of the Viceroy of Mexico, by whom he was sent, in a small *caraval*, to explore the Californian coast. He managed to reach lat. 47° N., and finding the coast inclined towards the N. & NE., and that a wide expanse of sea opened out between 47° lat., his position, and 48° , he entered the Strait, and sailed through it for twenty days. Finding the land still tended to NE. & NW. and also E. & SE., he proceeded, passing through groups of beautiful islands, and so sailed on until he came into the North Sea; but being quite unarmed, and finding the natives very hostile, he made his way back, and reported his discovery of the entrance to what he believed the North-West Passage.

But the Viceroy was not impressed with the value of the old man's report, and paid him nothing for it. Disgusted with the government and all belonging to it, he worked his way back to the Mediterranean, and we next meet with him as a pilot on the Adriatic.

Master Locke at once wrote to Sir Walter Raleigh, Master Hakluyt, and to Lord Cecil,

asking for 100*l.* to bring over the mariner who possessed such a knowledge of the north-west coast. All thought the information invaluable, but no one felt disposed to pay the money. Time wore on; the old storm-worn pilot, growing feeble, left for his native island. Locke again and again urged his request. At last the long-coveted means came, but too late, the old sailor was no more.

This strange story was current in England long after he who told it was dead and forgotten. A few believed it, but the many thought it an entire fabrication.

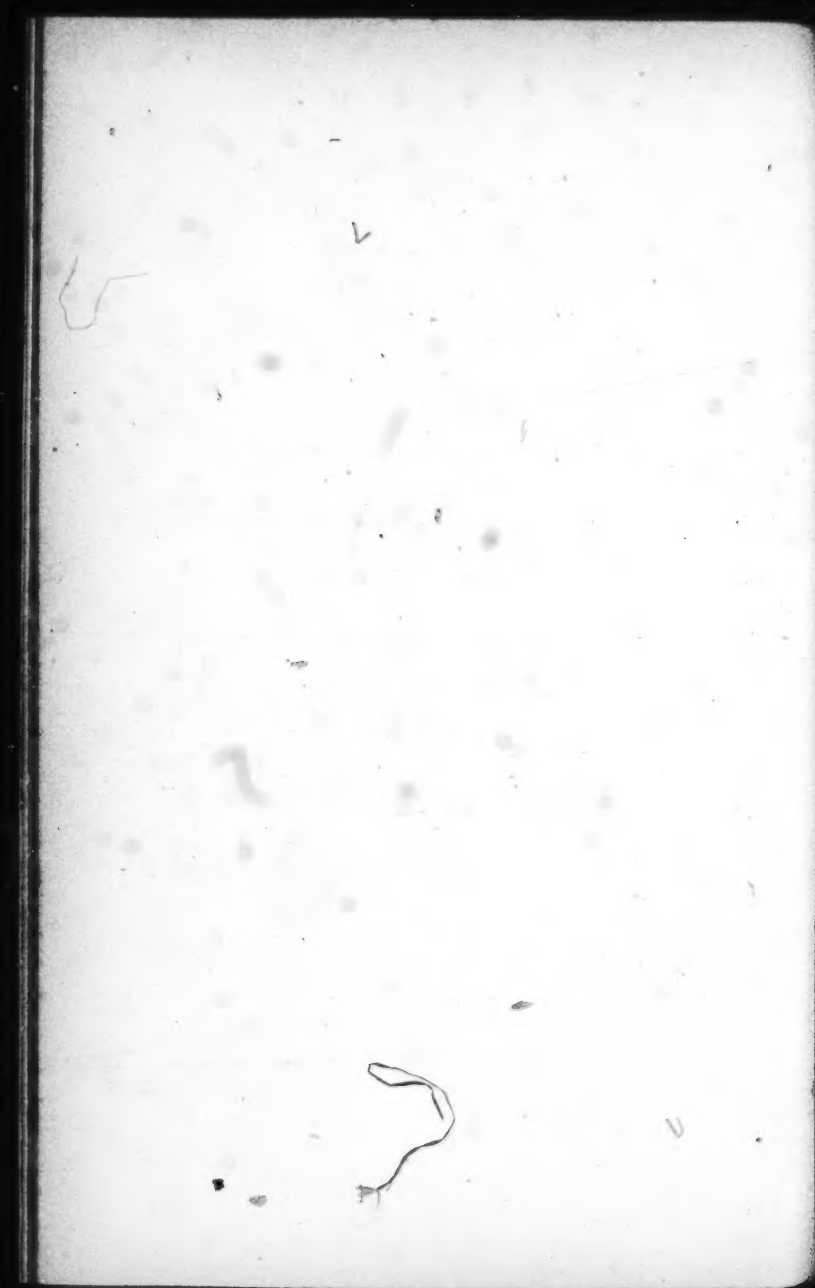
In 1776, Captain Cook missed the entrance to the Straits, and, mistaking the west side of Vancouver Island for the mainland, reported the story to be a fiction as told by the old sailor. It will suffice for explanation to skip a crowd of events, and take up the narrative of the discovery of the island in 1792, when Captain Vancouver was sent to Nootka Sound, for what purpose does not matter now. Coasting southwards, he entered the Straits, and eventually came out at Queen Charlotte Sound: which settled the question. The Island bears the name of its

discoverer (Vancouver Island), the Straits that of the old sailor (Juan de Fuca).

By the treaty of Washington, the 49th pl. of lat. N. was to be the recognised *Boundary Line*, the course through the sea to be the centre of the Gulf of Georgia, and thence southward through the *Channel* which separates the continent from Vancouver Island, to the Straits of Juan de Fuca.

The duties of our Commission were to mark the Boundary line from the coast to the eastern slope of the Rocky Mountains.

May 1860.



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ERRATA IN VOL. I.

- Page 88, line 19, *for blubbering read blubbery*
" 105, " 20, *for within read in*
" 157, " 2, *for scenery on my left. The read scenery. On my left the*
" 158, " 23, *for Nimkis read Nimkish*
" 164, " 9, *for this cannon read these cannons*
" 177, " 13, *for cauiare read caviare*
" 179, " 9, *for are read is; and line 15, for fourteen read seven*
" 195, " 9, *for three read one*
" 232, " 8, *for pack and equipment read pack equipment*
" 268, " 5, *heading to chapter, for The Desert Prong-horned read The Desert—Prong-horned*
" 296, " 8, *for Reiney read Reiner*
" 349, " 12 *for Actomys read Arctomys*

VANCOUVER ISLAND

AND

BRITISH COLUMBIA.

CHAPTER I.

THE VOYAGE.

WHETHER Good Friday was more unlucky than Fridays usually are, in the estimation of sea-going men, I know not, but from England to St. Thomas we encountered a succession of headwinds and terrific seas. Of course it was the regular typical storm: 'waves running mountains high, threatening instantaneously to engulf the struggling ship in a watery abyss; rent sails, creaking timbers, men lashed to the wheel (real tarry Ixions); screaming mothers, and remarkably sick papas and passengers,'—that ended in our case, as it usually does in all sensation sea-voyages. St. Thomas was arrived at in perfect safety, some few days after time.

Amongst the passengers was a lady, fat beyond anything I have ever seen (of the human

kind) outside a show. From the time of her appearance in the morning until her bedtime, she invariably sat in one place—her throne a small sofa, behind the cabin-door. Flying-fish were constantly driven on the deck of the steamer, or flung up into the sponsons by the paddlewheels; and being most anxious to preserve some of these curious tenants of the ocean, I tried every means to procure them; but the 'stout party,' by resorting to most unjustifiable bribing, so enslaved the sordid mind of the steward, that he got hold of the fish in spite of me, and actually had the delicate beauties cooked, and ignominiously fried at the galley-fire, for that terrible old lady to eat. With regret and indignation I have watched her munching them up, and wickedly longed to see her prostrated by that terrible leveller seasickness, or the victim of dyspepsia—evil wishes of no avail: she ate on, in healthful hungry defiance of wind and waves, and the wrath of an injured naturalist.

The first peep one gets of the little Danish town of St. Thomas, too well known to need more than a casual notice, is picturesque and pretty. Built on the scarp of a steep hill, its houses arranged in terraces, and all painted with bright and gaudy colours; its feathery groves of

tamarind-trees; gay gardens decked with flowers, possessing a brilliancy and magnitude seen only in a hot climate; together with the showy dresses of the natives, it becomes the more impressive as contrasted with the sombre island so recently left behind.

Scarcely had the 'Parana' steamed into the harbour—much more, by the way, like a stagnant cesspool than a rocky inlet, filled with pure seawater—when boats of all sizes, and far too numerous to count, crowded round us. Everyone, seeming at once to forget seasickness and rough weather, scrambled into this medley fleet, and with all speed were rowed ashore—there to remain, during the transference of the mails and baggage from the English steamer to the other vessels waiting to take their departure.

It has often puzzled me to imagine, why travellers in steamboats and sailing-ships invariably do the same thing. Take this very case as an instance of what I mean. Though yellow-fever was raging like a plague, still the greater number of the passengers made straight for the hotel, and there and then devoured a heavy breakfast composed of bad fish, raw vegetables (libellously called salad), unripe fruits, followed by a brown substance, in size, shape, and texture, vastly

like to the heel of a boot floating in hot oil, which we are informed by the polite waiter is 'bef steak à la Anglais'—the whole washed down with copious libations of intensely sour claret iced to the freezing-point.

The next thing in the programme is the exploration of the town, during which all sorts of things are purchased at fabulous prices, that can never, by any possibility, be required. Such unusual exercise in a hilly place, exposed to the scorching heat of the sun, soon begets a feverish thirst, necessitating copious draughts of iced-water dashed with cognac, unlimited cobblers, or more cold sour poison. Raw vegetables, acid wine, cobblers, cognac, cocoanut, and other 'comestibles' soon produce disagreeable admonitory twinges: dread of yellow-fever immediately suggests itself—bang goes the signal-gun! A hasty scamper for the boats dispelling further alarm, all rush on board, there to compare notes, groan over their pains and stupidity, and go through precisely the same performance at the next place of landing.

At St. Thomas we exchanged the commodious steamer 'Parana' for the 'Trent,' much more famous for getting into trouble than for getting out of it. The run from the island

across the Caribbean Sea to Santa Marta, after the tumblings and buffetings that would have been good training for an acrobat, endured betwixt England and St. Thomas, seemed to me the very perfection of sea-travelling. Although a most enjoyable passage, still it became monotonous: one tires of old threadbare jokes and yarns, and wearies even of gazing day after day into the clear blue sea, each day appearing the very counterpart of the other.

Sluggish lump-fish, with their uncouth heads and misshapen bodies, continually wriggle slowly and idly along with us; sun-fish, in their parti-coloured armour, float by, ever performing eccentric undulations. Now a stiff black fin cleaves the water suspiciously, leaving a wake behind, as would a miniature ship—the danger-signal of a greedy shark; huge leaves of kelp, wrack, and sea-tangle drift by, rafts to myriads of crustaceans and minute zoophytes; the rudder creaks and groans to the music of its iron chains, clanking over the friction-rollers, as the helmsman turns the wheel; sea-birds peep at us, then wheel away to be seen no more; whilst ever following are the ‘Chickens of Mother Carey,’ dipping, but never resting, on the ripple at the stern.

I had both heard and read of a formidable fortress that once guarded the entrance to the snug harbour, on one side of which stands the neat little town of Santa Marta, embowered amidst the trees. We sighted the land before it was dark, but the captain deemed it expedient to lay-off and await the daylight, ere venturing through the narrow entrance between the rock on which stands the remains of the fortress and the mainland. Issuing strict orders, coupled with a silver refresher, to my cabin-boy to call me before daylight, I turned in, and was soon in dreamland; my dreams were dispelled by a sudden shake, and the voice of the faithful darkie boy screaming into my ear, 'Ili, massa, him no see fort if him no tumble out and tumble up pretty quick.' Lightly clad and hardly awake, I rush, glass in hand, on deck, and quietly seat myself in the bow of the steamer. It was just in the grey of the morning; not a sound disturbed the deathlike silence, save the 'splash-splash' of the slowly-revolving paddle-wheels. I could discern on my right a dim line of trees, that looked as if they grew from out the water; on my left the dark rock, crowned with its ruined fort, that, as the light increased and the rays of the rising sun slanted down upon it,

looked like a mass of frosted silver—so brilliant was the contrast to the dark water and darker woods, still in shadow, behind and around it.

Delighted with the singular beauty of the scene, and wandering, in imagination, far away into the vistas of the past, recalling scenes of frightful atrocity once enacted within the dreaded gates of the buccaneers' stronghold—wondering too if gems and gold, plunder wrenched from many a rich argosy, still lay hidden amidst the dust of its crumbling walls—a sudden flash, and a jerk that sent me sprawling on the deck, at once recalled my thoughts from the past to the present. Utterly oblivious of what had happened, as I scrambled on my legs, a stifled laugh induced me to look round. 'Wish I may never taste rum again, Cap'en, if I ever see you a-sittin on the signal-gun,' said a sly-looking rascal in sailor's dress. There was a roguish leer in his eye that revealed the whole secret. Seeing me seated on the signal-carronade, loaded to announce our arrival, was too tempting a chance to indulge in a practical joke for Jack to resist; so he quietly touched off the gun, without giving me any notice. No doubt he has had many a hearty laugh at my expense since then, when telling the 'yarn' in far-away latitudes. Our stay in the

harbour was very brief; the mails and a passenger or two landed, away we steamed again.

At Carthagena we only lay-off a short time, to land the mails, and take on board the strangest assemblage of natives I ever saw. They were bound for Colon, to sell the various products of their farms, gardens, and native forests. We were about half a mile from the beach; a good rolling swell broke, in small waves, against the ship's sides, and spread its foam far up the shingle inshore. Up to their waists might be seen the dusky forms of the natives, launching long, ugly, shallow canoes, dug from out the solid wood. Soon a perfect fleet of them neared us, each striving to be first alongside; as they converged, and steadily packed together, into a confused mass, the yelling, screaming, and swearing in bad Spanish, mixed with some unknown tongue, baffled all description. Bad as the hubbub was when some distance from the steamer, it was ten times worse as they literally fought and struggled to get on board. Those who were to be passengers, in dread of being left behind, dashed from canoe to canoe, reckless of the rage of those intent only on selling their wares. Here one held up a poor little drenched and shivering monkey, another a screaming parroquet, a third a squirrel; others

fruits, strings of beads, vegetables, bunches of bananas, and cocoanuts—all shrieking at the very top of their voices, but what they said no living soul could tell. Soon the deck forward was filled with its live and dead freight. The first turn of the paddlewheel sent the queer-looking assemblage scudding out of the way, to ply back again, with their unsold wares, to dingy old Carthagena.

As we steamed quietly along, I had time to examine the new arrivals. Squatted in little groups or families, each group had all its property, piled or stowed in some fashion, amidst them, consisting of bundles of all shapes and sizes, crockery, parrots and parroquets, quantities of eggs and live poultry, fruits such as are usually consumed in tropical countries; bananas, mangoes, cocoanuts, water-melons, bad oranges, and vegetables; but what was most valued and cared for, clearly the grand object of the visit, were numbers of gamecocks, all *trimmed*, according to the most approved fashion, and tied by the leg, either to the bedding or, failing anything else, to the person of the owner. These Carthaginian blacks are evidently of mixed descent; most likely a sprinkling of Spanish blood flows through their veins. The

men, of small stature, are lithe, sinewy, and extremely active; the women have a decided tendency to become fat; one or two of them had attained to such a state of obesity, that walking was next to an impossibility. The children are the most singular little frights imaginable; guiltless of garments, they seemed all eyes and stomach, arms and legs being merely trifling unessential appendages; a singularity of form that may, I presume, be traced to the habit of consuming such vast quantities of innutritious vegetable food.

We reached Colon (or Aspinwall, as the Americans have named it) in due course, and landed about midday. The outfit being enormously heavy, some time had necessarily to be occupied in landing; and as the afternoon train was about to start, it was deemed the wiser course to send the men and officers at once to Panama, where Her Majesty's ship 'Havannah' was waiting to take us to Vancouver Island—the Commissioner and myself remaining at Colon, with a sergeant and small working-party, to bring on the baggage. All the attendant miseries of unshipping such a heterogeneous medley of packages as we had on board was finished at last, and our equipment safely

stowed away in the goods-vans of the Panama Railway Company.

An invitation from the manager of the railway to the Commissioner to sleep at their messhouse was by him gladly accepted; a favour not extended to myself, so I had to take up my quarters at the 'Howard House.' Now the 'Howard House' was managed precisely on the same plan as a travelling wild-beast show; the entire attraction was on the outside. The bar-room, brilliantly lighted, and glittering with gilt, glass, and gaudy ornaments, was open to the street; an array of rocking-chairs, before the pillars supporting the verandah, enabled the luxurious lounge to sit with his heels higher than his head, and in smoky abstraction contemplate his toes. The barman, all studs and shirt-front, hardly deigned to answer my request for a bed, but, pointing to the entry-book, said, 'Waal, you'd better sign.' My name duly inscribed on the page of a huge and particularly soiled book, a key was handed me, adorned with a brass label, attached to a chain of like material, with No. 10 on it. 'Guess, stranger, I want a dollar—and you jist look here: there are two beds, so if anyone comes along, he'll jist have to room with you.' This I decidedly objected to. 'Waal,

can't help it nohow; thar ain't no other room.' 'If I pay for both beds,' I replied, 'surely I can have it all to myself?' This was at length agreed to, the money paid, and at an early hour I turned in, to enjoy a good sound sleep ashore.

Excepting two miserable, hard, curtainless beds, an old rickety chest of drawers, and a couple of chairs, the room was destitute of furniture; but spite of all discomfort, mosquitos, and other pests, *felt* if not seen or heard, I fell fast asleep, soon to be roused again by a loud knocking at my door, the sound of numerous feet scuffling hurriedly up and down the passage, and a very Babel of voices. Hardly awake, my ideas were in a jumbled sort of chaos as to the cause. Fire, burglars, riots, a house-fight, were all mixed in strange confusion, until an angry voice, that appeared to come through the speaker's nose, yelled, rather than spoke, 'Say, ar you agwine to open this door? Our women want them beds for a lay-out, and jist mean to havin em, anyhow.' 'Ah!' thought I, 'they want the spare bed I have paid for.' Of course I refused—who would not?—and, dragging the old chest of drawers against the door, defied them to do their worst.

In the angry parley that ensued, I discovered that a steamer had just arrived from New York, en route to the new gold-diggings in British Columbia, with 1,500 passengers, who, rowdy-like, demanded everything. Threats of administering the summary law of Judge Lynch—of firing their six-shooters through the door, and riddling me like a rat in a hole—together with sundry hard names (it is better to imagine than mention), were heaped profusely on my devoted head. As it appeared to me quite as unsafe to surrender as to remain in my fortress, I determined on holding out to the last.

Fortunately, daylight soon came, and with it the shrill whistle and clanging bell, announcing the departure of a railway-train. Peeping cautiously through the window, I saw, to my intense delight, a long train specially ~~for~~ on, and the rowdies just ready to start. I watched them scrambling in, and as the engine with its freight dashed into the tropical jungle, I emerged from my room and the 'Howard House' with all possible speed, completed my toilet at the barber's shop, breakfasted with the Commissioner at the Company's messroom, and thus ended my night in Colon.

The agency and mess establishment of the

Panama Railway Company are really delightful residences, overshadowed by cocoanut trees, and surrounded by perfect bijous of gardens entirely reclaimed from the swamps: the papaw, the banana, blossoming creeping plants, fruit-bearing vines, and curious orchids, all growing together, a wild tangle of loveliness, yielding beauty, fruits, and shade. The cool verandah, and cane-chairs from China, together with the comfortably-furnished interior, gave ample proof that the products of a tropical country may be used to good account, as additions to our northern ideas of a substantial home.

One of the most singular flowers growing in this pretty garden was an orchid, called by the natives 'Flor del Espiritu Santo,' or the 'Flower of the Holy Ghost.' The blossom, white as Parian-marble, somewhat resembles the tulip in form; its perfume is not unlike that of the magnolia, but more intense; neither its beauty nor fragrance begat for it the high reverence in which it is held, but the image of a dove placed in its centre. Gathering the freshly-opened flower, and pulling apart its alabaster petals, there sits the dove; its slender pinions droop listlessly by its side, the head inclining gently forward, as if bowed in humble submission, brings

the delicate beak, just blushed with carmine, in contact with the snowy breast. Meekness and innocence seem embodied in this singular freak of nature; and who can marvel that crafty priests, ever watchful for any phenomenon convertible into the miraculous, should have knelt before this wondrous flower, and trained the minds of the superstitious natives to accept the title the 'Flower of the Holy Ghost,' to gaze upon with awe and reverence, sanctifying even the rotten wood from which it springs, and the air laden with its exquisite perfume? But it is the flower alone I fear they worship; their minds ascend not from 'nature up to nature's God;' the image only is bowed down to, not He who made it. The stalks of the plant are jointed, and attain a height of from six to seven feet, and from each joint spring two lanceolate leaves; the time of flowering is in June and July.

We were to have a special train (the cost of crossing the isthmus was something enormous—the actual amount I do not now remember); and as we were most desirous to see as much of the country as possible, an open goods-truck was appropriated to our use, in which we could stand, and have a full peep at everything as we steamed along. Whilst the train was

getting ready, I took a turn over the Company's wharf and round the town.

The Wharf, built on piles driven into the coral reef, extends about a thousand feet in length, and forty in width, with a depth of water at its landing-end sufficient to float the largest ship. The piles are from the forests of Maine, and have to be coppered above high-water-mark, to resist the destroying power of a boring worm (*Teredo jimbriata*), that would otherwise destroy them in a very few months. The Freight Department is a handsome stone structure, three hundred feet long by eighty wide, through the arched entrance to which is a triple line of rails.

Man, it is said, differs from all other animals, in being 'a tool and a road-making animal,' the truth of which was well exemplified in the curious assemblage of products collected from all parts of the world, and stowed in this huge house, brought by man's ocean highways, and awaiting removal by his iron roads and horses.

Ceroons of cochineal and indigo from Guatemala and San Salvador, cocoa from Ecuador, sarsaparilla from Nicaragua, coffee from Costa Rica, hides from the North and South Pacific coasts, copper-ore from Bolivia, linen goods

from the French and English markets, beef, pork, hard bread, cheese from the States, and silks from China.

The town of Colon, as everybody perhaps does not know, stands on a small island called Manzanilla, cut off from the mainland by a narrow frith; the entire island being about one square mile in extent, composed of coral reefs, and only raised a few feet above highwater-level. It has no supply of fresh water but what is obtained during the heavy rains; this, collected in immense iron tanks, that hold over four thousand gallons, supplies the inhabitants during the dry seasons.

The most conspicuous objects one meets with in this dismal place are flocks of turkey-buzzards (useful inspectors of nuisances, as they do their own work of removal), pigs, naked dirty little children in legions, bleary-eyed mangy curs that do nothing but growl and sleep; together with peddling darkies, bummers, and loafers (I know no other names so expressive of this species of idler as these Transatlantic ones), that employ their time much in the same fashion as the curs. A line of shops faces the sea, and at a little distance is the 'mingillo,' or native mar-

ketplace, a spot no one would be disposed to linger in or visit a second time, unless the nose could be dispensed with. 'Noses have they but they smell not,' must surely apply to the dwellers in the marketplace; the air is *literally* (and not in figure of speech only) *laden* with the mingled fragrance of past and present victims, an odour far more potent than pleasant. Surely ladies never go to market in Colon!

The train was by this time ready to take us to Panama, and, with a parting scream, the iron horse rushed into the tropical wilderness. On leaving Colon, the line winds its way through a deep cutting across a morass, and along the right bank of the Rio Chagres; glimpses are caught of the river from amidst the tangled and twisted foliage that shuts it in on either side like dense walls. From out this leafy chaos rise the gaunt trunks of the mango, cocoa-nut, plañc, cieba, and stately palm. Plantains, too, spread their green succulent leaves—sunshades of nature's own contriving—to protect the tender growths that love to live beneath them. Every tree seemed strangling in the coils of trailing vines and climbers; real ropes, pendants, and streamers of brilliant blossoms, fit resting-places for the birds and butterflies, themselves like living flowers. Wondrous

orchids, grotesque in form and colouring, grew everywhere, springing alike from the living and the dead; for amidst this flood of vegetable life, decay and beauty, like twin sisters, walk hand-in-hand.

We stopped at Gatun for a short time, the station being close to the little village of bamboo huts thatched with palmetto-leaves, and only remarkable as being the place where the 'bon-goes' (or native boats) used to stop for the travellers to refresh themselves ere the railroad was. From here the line skirts the bases of an irregular series of hills to cross the Rio Gatun, tributary to the Rio Chagres, on a well-made truss girder-bridge of seventy feet span; passed Frijoli, where the fields of golden maize were decked with what looked, at a distance, like immense bouquets of scarlet flowers; and along the banks of the Rio Chagres, which are here very deep, to cross it at Barbacous on a wrought-iron bridge, six hundred and twenty-five feet in length, eighteen in breadth, and forty feet above the surface of the water. There are six spans, each over a hundred feet; iron floor girders, three feet apart, support the rails—the entire structure resting on five piers and two abutments.

After crossing the river, the country becomes open, and large patches of rich land are seen under a rude kind of cultivation, until the native town of Gorgona is reached, where, in old days, boats were exchanged for horses and mules, on the overland route.

Leaving the course of the river, the line passes through deep clay banks and rocky cuttings, suddenly emerging on the green meadowlands surrounding Matuchin. I never gazed on a more exquisite panorama. Dotting the foreground was a pretty native village; to the left the Chagres, and its tributary the Rio Obispo; on the right a group of conical hills, so clothed with vegetation that it was impossible to imagine what the land would look like if the trees were cut away. During our stay at this station we were regularly beset; numerous vendors of native merchandise crowded into and round about the open van; grey-haired old men, and women, pushed trays under our very noses, covered with filthy pastry, gingerbread, sweetstuff, and other like abominations; whilst little black urchins sat like jimps on the rails of the truck, each with some live captive for sale—monkey, squirrel, parrot, or other bright-plumaged bird.

Following the valley of the Obispo, which

river is crossed twice within a mile on iron bridges, we ascend gradually (the gradient being about sixty feet in the mile) to reach the watershed, over which the descent commences to the Pacific. About a mile from the summit the line winds through a huge pile of basaltic columns, that look as if some Titan force had hurled them into the air, and let them fall again one over the other, like a mass of driftwood piles itself in a North American river. Below, the Rio Grande may be seen, a mere brawling burn; a short distance through thick woods, and we are at Paraiso; as unlike one's ideal of paradise as Cremorne Gardens or Ratcliff Highway. Again we reach the swampy lowlands with their dense growths; ahead, and looming high in the glowing atmosphere, stands Mount Ancon, whose southern base is bathed by the blue waters of the Pacific; on the left, Cerro-de-los-Buccaneros, or the Hill of the Buccaneers, from whose summit the terrible Morgan first looked on old Panama in the year 1670. We rattle past San Pedro Miguel and Caimitillo, small tidal tributaries to the Rio Grande, scream through the Rio Grande Station, sweep round the base of Mount Ancon; and before us are the tall spires of the cathedral, the long

metal roofing of the terminus, and the quiet waters of the Pacific.

Captain Harvey, R.N., then in command of Her Majesty's ship 'Havannah,' met us at the terminus; the ship's boats were in waiting to take both men and baggage on board, so that I saw but little of Panama. My old foes (that waged war against me at Colon), the gold-seekers, were assembled on the wharf, awaiting the small tugboat to take them off to the larger steamer anchored in the offing. To judge from appearances, there were amongst them a goodly sprinkling that would have deemed lynching or riddling a Britisher, a capital joke.

A tropical sun soon makes one thirsty. I wanted 'a drink,' and for the first time tasted iced cocoanut-milk; never in my life have I ever drunk anything half as delicious. Don't imagine that, in the least degree, it resembles the small teacupful of sweet insipid stuff dribbled out from the cocoanut as we buy it here in England. What we eat as kernel is liquid in the young nut, and the outer husk soft enough to push your thumb through. Surely the cocoanut palm must have been specially designed for the dwellers in the tropical world! It supplies everything uncivilised man can possibly need, to

build his ships, rig, paddle, and sail them; from its products, too, he can make his houses, and obtain food, drink, clothing, and culinary utensils. Strictly littoral in its habits, the cocoa-palm loves to loll over the sea, and let the frothy ripple wash its rootlets. This also looks like another link in the chain of Divine intentions. The nuts necessarily fall into the sea—winds and currents carry them to coral reefs, or strand them on desert shores, there to grow, and, by a sequence of wondrously-ordered events, in time make it habitable for man. The 'Havannah' dropped down to the beautiful island of Tobago, to take in water ere she sailed for Vancouver Island.

As we crossed the Bay of Panama (which is, I believe, about 135 miles wide, running inland 120), pelicans, far too numerous to count, were floating high in the air, some of them mere specks. The species *Pelecanus fuscus* (the brown pelican) is a permanent resident on the southern coasts of America, frequenting in great numbers the shores of the Gulf of Mexico, California, the Bay of Panama, and other sheltered inlets. They frequently build in the trees, although the nest is quite as often placed on the ground, even when the former are close at hand. My acquaintance

with the pelicans in the Zoological Gardens in the Regent's Park had given me an idea of clumsiness, and to see them *spooning* the fish from out their pond is certainly no indication of being adepts at fishing. I know no prettier sight than to watch the brown pelican fishing in the Bay of Panama ; no awkwardness there, every movement easy and graceful. Soaring high in the lurid atmosphere, to the eye little more than a tiny dark spot, suddenly down comes the bird as if hurled from the clouds ; plunging in head-first, its sharp beak cleaves the water like a wedge ; a fish seized is at once pouched ; and, rising without any apparent effort from the sea, it soars off again, to look out for another chance. Should the fish be missed, an event that does not often happen, the bird sits quietly on the water, and stares round in stupid astonishment.

We remained several days at Tobago ; and as we rode at anchor in the deep roadstead, I could have easily pitched a penny into the groves of tamarind and orange-trees, that grew on the very beach. From the sea-line to the summit of the island, which is quite a thousand feet in altitude, the hills rise in terraces, but so densely clothed with cocoa-nut, banana, tamarind, orange, and

other tropical trees, that one hardly credits the existence of terraces, or that hill and valley are hid beneath the unbroken surface of green. A little village lies hid in a palm-grove at the base of the hill, and in the ravine behind it bubbles up the spring of pure fresh water, that never fails, and from which all vessels touching at Panama obtain their supply.

Mr. Baurman, a geologist, accompanied me on a ramble through its woods and along the sea-coast. We did nothing to distinguish ourselves save getting frightfully hot, being wellnigh famished with thirst (for we were far away from the water), and although I fired at the cocoanuts in the hope of bringing one down, only succeeded in making holes in them and letting out the much-coveted milk, that fell on us like a shower of rain; shooting a few doves amongst the pineapples, and a turkey-buzzard on the summit—a frightful crime in Tobago, of which, at the time, I was in happy ignorance; but, fortunately for me, Baurman carried the bird, and was deemed, for his good nature, the greater culprit. The most singular sight we stumbled on was a bull, saddled and bridled in equine fashion, with a black man riding on his back. Tauro might

have been a good hack, but he certainly did not look so as he waddled lazily along with his sable rider.

The inhabitants, with few exceptions, are blacks. There was one girl (the property of as repulsive an old demon as one could well see) perfectly blonde, fair even to paleness, with soft blue eyes and long golden hair, that hung in wavy ripples down to her waist—her feet and hands delicately small, and a figure Venus might have envied. Where she came from no one knew: one might have supposed her the descendant of some Viking, if Vikings had ever cruised in the Pacific. Perhaps her owner was a 'Black Pirate,' who stole the damsel, and knifed her friends; not bad material for a *sensation* story—'The Fair Captive of Tobago.'

The view from the summit was exceedingly lovely. Behind, and to the right and left, the dark-green slope looked as if one could have slid into the vessels at their anchorage; before, a vertical wall of rock a thousand feet from the sea. It looked to me as if the island had been broken in two in the centre, and that one-half had sunk into the water and disappeared; the air quivered even at this height, as it does over a limekiln; not a leaf stirred—

the intensely blue sea was unrippled far as eye could reach; the very birds and insects, too hot to fly, sat panting under the shadow of the leaves. We gathered a pineapple, but it tasted hot, as if half-roasted.

I am not favourably impressed with the honesty of the islanders that do the washing, or rather that do not do it. Following the example of the officers of the 'Havannah,' I delivered my bag of clothes, the accumulation since leaving England, to the washer, who promised, as only a black washerman will promise, to have it on board before we sailed: he kept his word, for he came when the ship was under weigh, had his money, and with bows, and prayers for my welfare in this world, vanished over the side. We were well out to sea when I looked at my bag; imagine my wrath at finding everything just as I had given it. It was lucky for the rascal he was out of reach, and perhaps quite as well for me; a dollar (4s.) a dozen to carry one's clothes ashore, most likely to wear, and bring back again dirtier than it went, would enrage the meekest saint!

The voyage in the 'Havannah' from Panama to Vancouver Island was a long and wearisome one. We left Tobago on June 4, and entered

the Straits of Juan de Feuca on July 12. Reference to the track-chart shows how we idled and idled along on the sea, sauntering, rather than sailing; with a blazing sun right over the masthead, the heat was intolerable, and attended with a depressing languor, that forbade all energy, and fairly melted one in body and mind. The only land sighted was a very distant view of the Gallopagos Islands, a mere black looking spot on an interminable surface of blue. This group of volcanic islands, so strangely isolated, might have been a monster fish, a phantom ship; or even the great sea-serpent, for anything that could be definitely made out, even aided by a ship's telescope.

We caught great numbers of dolphins (*Coryphæna hippuris*), which are far more lovely to the eye than agreeable to the palate, in my estimation. This fish, usually from four to five feet in length, is built for rapid passage through the water: the tail, forked like horns, together with the long dorsal fin, reaching from head to tail, enables it to turn with an ease and celerity during even its swiftest transit through the sea. All who have written (in prose or poetry) about the dolphin have attempted a description of its marvellous colouring: to convey, by word-paint-

ing, the slightest idea of the changing, flashing, glowing radiance that plays around and upon this fish, when fresh from the ocean, is as impossible as to describe the colours of the Aurora, or the phosphorescence of the tropical seas; it must be witnessed to be realised in all its magnificence. Flying-fish are its favourite food, and these the dolphins course as greyhounds course hares; what is called 'flying' being merely an extended leap, aided by the immensely-elongated pectoral fins, made in sheer desperation to escape the voracious sea-hounds so hotly pursuing them.

In reference to these same flying-fish, the species washed on board the 'Parana' by the waves of the turbulent Atlantic, and that found their way into the stomach of a dolphin of terrestrial habits, was *Exocetus exiliens*. I could see nothing of its movements, as the sea simply washed it into the sponsons, or left it floundering on the deck. Its general appearance was exactly like a newly-caught herring: the scales, thin and rounded, easily detached, and adhered to the hand; the back a light steel-blue, with greenish reflections, shading into silvery whiteness on the sides; the pectoral fins reached quite to the tail, and were shaped like the wings of a swift; the

dorsal and anal fins are opposite each other, and placed near the tail, which is deeply but unevenly forked—the lower limb being much the longer; the ventral fins, which are posterior to the middle of the body, are unusually long and strongly rayed.

But in the uncomfortably calm Pacific, where I watched the flying-fish every day, and often all day long, I had ample opportunity to observe its so-called 'flying.' The species that tenant the two oceans are very nearly allied, *Exocetus volitans* being the one common to the Pacific; but it is of habits I wish to treat, not of minute specific distinctions—that can be settled in the studio. It seems to me that the distance traversed when the fish leaps from the sea, and the length of time it remains out of the water, are much overestimated in books on Natural History. Ten or twelve seconds may be taken as the average time of its flight, and eighty yards the maximum distance traversed when the water is perfectly tranquil; if aided by a breeze of wind, or propelled from the crest of a breaker, the distance accomplished would necessarily be greater; but the fins have no power to raise the fish a single inch above the level of its leap, and simply aid in its support, as the extended skin of the flying-

squirrel bears it up in its spring from bough to bough. I have never seen the fins vibrated or flapped, as all wings invariably are, but, stiff and rigid, are extended and still, until the fish plunges into the sea. Numbers, beyond all computation, were constantly seen by us in the air together, when chased by predatory fish. The flying-fish, as a rule, is about twelve inches in length.

We caught several sharks, and an immense hammerhead (*Zygana vulgaris*), that we could not catch, followed us for a very long time. As I looked at him sailing along under the stern of the ship, I was at a loss to imagine for what purpose such a head was given to it; exactly like an immense caulking-hammer, with an eye in each end; in every other detail of shape, and in habits of voracity too, as far as I know, it resembles the ordinary sharks. That it is so constructed to serve some special purpose in its economy there can be no doubt, but what that may be, remains to be discovered. We fished for albatross with marked success, to be devoured by both men and officers, stuffed as a goose; the rag from off the bung of a cask of whale-oil, rubbed with an onion and chewed, would be mildly flavoured as compared to the

flesh of this sea-bird. Petrels were ever with us, like flights of martins round the habitations of man; always on the wing, never resting, or roosting either, as far as I could see; watch them in their easy graceful flight, till the last lingering ray of light sank away beneath the watery horizon; and, as night wrapped them in her sable mantle, they were still on the wing. Be on deck as the first blush of early dawn crept drowsily over the sleeping sea, and with the rosy light came the petrels, still flying, as they had vanished in the darkness. We tried to catch them by loosing long threads over the stern, and tangling them, like human spiders; we did trap one, but the sailors were mutinous at such unheard-of barbarity; injuring the chickens of 'Mother Carey' was an offence not to be tolerated, even in a zealous naturalist; so, at the captain's request, the cotton webs were abandoned. The one taken was the black stormy petrel, *Thalassidroma melania* (C. Buonaparte): upper plumage entirely black (as are the wing-coverts), below fuliginous; tail deeply forked, and very short:

It is a well-marked species, and readily distinguished from all its kindred by the absence of white on the rump and wing-coverts. We caught a huge turtle with a hook and line: a

number of lines were hanging from the bow, the ship almost still, when there was a tremendous hue-and-cry that a turtle was hooked. To hold him with the line would have been an utter impossibility—he could have smashed it like pack-thread. The barbed trident called ‘a grains’ was brought into immediate requisition, and from the ‘dolphin-striker’ an experienced hand sent it crashing through the turtle’s armour-plates; a boat was lowered, tackle rigged, and the ponderous reptile safely deposited on the deck. The species I was unable to determine, for I had barely time to seize the sucking-fish (*Remora*) that were clinging to its shell in clusters, and observe the curious beings, parasitic and others, that evidently used the turtle as a living raft, on which to cruise about, ere the remorseless cook, armed with knife, axe, and saw, hewed and hacked the monster, I could have devoted days to examine, into junks for the pot. The harvest gleaned from his shell I shall speak of in the chapter on Fishes.

All our fresh provisions had long been expended, and water reduced to a very small supply per diem, when on the 11th of July, the seventieth day at sea, ‘land on the starboard bow’ was an

announcement welcome to all. Being near dark, it was deemed advisable to stand off until morning, and enter the Straits of Juan de Fuca with a good light. It appeared a longer night than I ever remember, so impatient was I once more to see and tread on *terra firma*; what in the mist and distance seemed but a dark undefined shadow, was in reality the lighthouse, standing grey and lonely on the wild wave-lashed rocks of Cape Flattery. The wind was dead aft, and blowing freshly, as we dashed up the straits, faster far than we had ever gone during the long tedious voyage.

Nowhere is this curious inlet more than twelve miles in width: on the right, seen over an ocean of dark-green forest, sloping to the shore, were the snowy summits of the Olympian range of mountains; on the left the more rounded and lower metamorphic hills, quite as densely timbered, but broken along the coast-line into open glades and grassy slopes, like well-kept lawns, reaching to the water-line. About sixty miles from the entrance we round the dreaded 'race rocks,' and with scarce time for even a hasty look at the new land, glide round a rocky point, on which is a house, and people anxiously watching our movements. The sails are clewed up;

orders are rapidly given, and as quickly executed. A heavy plunging splash and the rattle of the massive cable, as it crashes through the hawse-holes, proclaim our anchorage in Esquimalt Harbour, and safe arrival at Vancouver Island.

CHAPTER II.

VICTORIA—THE SALMON: ITS HAUNTS AND HABITS.

WE were landed, soon after our arrival, on a rocky point of land with a snug sheltered bay on each side; an easy slope led up to the frame of a house, destined to be our headquarters; a pretty spot, very Englishlike in its general features, but in the rough clothing of uncultivated nature. Tents were pitched, the baggage carried safely up and stowed away, and the first camp of the Boundary Commission established in this new land of promise.

Our first walk to Victoria, now the thriving capital of Vancouver Island, was made on the evening of our landing. The gold-fever was just beginning to rage fast and furiously, and all classes, from every country, were pouring in—a very torrent of gold-hunters. Not that *gold-hunter* means only he that digs and washes the yellow ore from out Nature's treasury, but includes a herd of parasites, that sap the gains of the honest digger; tempting him to gamble, drink

poison (miscalled whisky), and purchase trashy trumpery, made, like Pindar's razors, only to sell; and thus fool away his wealth; 'earned like a horse, squandered like an ass!' Both species were well represented, in what could not, in any sense of the word, as yet be called a town.

The old trading-post of the Hudson's Bay Company, the governor's house, and a few scattered residences of the chief traders and other employés of the Company, alone represented the permanent dwellings. But in all directions were canvas tents, from the white strip stretched over a ridge-pole, and pegged to the ground (affording just room enough for two to crawl in and sleep), to the great canvas store, a blaze of light, redolent of cigars, smashes, cobblers, and cocktails. The rattle of the dice-box, the droning invitation of the keepers of the monte-tables, the discordant sounds of badly-played instruments, angry words, oaths too terrible to name, roystering songs with noisy refrains, were all signs significant of the golden talisman that met me on every side, as I elbowed my way amidst the unkempt throng, that were awaiting means of conveyance to take them to the auriferous bars of the far-famed Fraser river. Along the side of the harbour, wherever advantageous

water-sites were obtainable, the noise of busy industry sounded pleasantly in contrast to the mingled hubbub I had just left. Higher up the slope, substantial stores were being rapidly built. Out of these germs grew the present town the capital of the island, that we shall often have to visit in the course of this narrative.

With the island, and its history as a colony, I have but little to do. Other and more able writers have said all that need or can be told about its commerce, agriculture, politics, and progress. The prairie, forest, lake, river, sea, estuary, and rocky inlet are my domains; to their tenants I have to introduce you, guide you to their homes and haunts, and bring you face to face, in imagination, with the zoological colony of the Far North-west.

First, of the island. Vancouver Island is situated between the parallels of $48^{\circ} 20''$ and 51° N. lat., and in from 123° to 128° W. long—its shape, oblong; length, 300 miles; its breadth, varying at different points, may be taken at an average of from 35 to 50 miles. The island may be characterised as an isolated ridge of mountains, which attain, at their greatest elevation, an altitude of about 6,000 feet. There are no navigable rivers, but numerous mountain-streams,

that, as a rule, have a rapid descent, and empty into inlets or arms of the sea, everywhere intersecting the coast-line, east and west of the watershed. Lakes, large and small, are common, from the summit of the hills to the flat gravel lands near the coast; dense pine-forests clothe these hills to their very tops. On the open lands, misnamed prairies, the scrub-oak (*Quercus garryana*) grows so gnarled and contorted that stock, branch, twig, and even the very leaves look as if they suffered from perpetual cramp. Alder, willow, black birch, and cottonwood fill the hollows.

The climate of the island is milder and more equable than it is on the adjoining continent, and closely approximates to that of Great Britain.

The shortest road to an Englishman's heart, says the adage, is down his throat; and being a road a good deal travelled, is it to be wondered at if fish (especially such as are welcome travellers down this same 'red lane') should have been the first objects of practical Natural History to which the naturalist, fresh from the 'old country' and seventy-two days' imprisonment on board-ship, turned his attention? The first fish I saw and tasted was salmon; and to the Salmon and its haunts I at once introduce you.

SALMO QUINNAT.

Richardson, F. B. A., 'Fishes,' p. 219; Common Salmon, Lewis and Clark. INDIAN NAMES: at Chinook Point, mouth of the Columbia, *Quinnat*; at the Kettle Falls, *See-met-leek*; by the Nesquallys, *Satsup*.

SPECIFIC CHARACTERS.—Head, just one-fourth of the entire length, measured from the tip of the nose to where the scales terminate at the tail; the operculum very much rounded, and usually with several spiny projections on the outer margin; preoperculum rounded much the same, but wanting the serrated margin; branchial rays, fourteen. Cleft of the mouth posterior to the eye, which is a dark copper-colour in the freshly-caught fish. The teeth are large and strong in both jaws, but they vary in number according to the age, sex, and condition of the salmon; about ten in each limb of the jaws may be taken as the usual average in an adult fish. Those on the tongue are smaller, and placed in two rows, six in each row. The vomerine and palatine teeth are again much smaller and weaker than any of the others, corresponding to such as stud the gullet.

Fresh from the water, the colours in a healthy fish are particularly marked and bright, but change rapidly after death. The back, through

its entire length, is a light steel-blue; shading off on the sides to a lighter tint, that merges by imperceptible gradations through grey to silvery-white on the belly; blushed over with pink, that disappears soon after death. Back, above the well-defined lateral line, thickly spotted with black, the spots being like stars with rays of irregular length; but I have very often seen the spots extending beyond the lateral line, and even on the white of the belly. Opercula, all the fins and the tail more or less spotted, and of a pinkish hue, the anal and pectoral fins tipped with black. The general appearance of this salmon is that of being very thick for its length, the dorsal outline slightly arched, forming almost a notch with the tail.

Soon after our commencing work, I was encamped for many months on the banks of the Chilukweyuk river, a tributary to the Fraser, having a short but rapid course through a rocky valley.

In June and July salmon ascend this stream in incredible numbers, filing off as they work upcurrent into every rivulet, filling even pools left on the prairies and flats by the receding floods.

About a mile from my camp was a large patch of pebbly ground, dry even at the highest floods, through which a shallow stream found its way into the larger river. Though barely of sufficient depth to cover an ordinary-sized salmon, yet I have seen that stream so filled, that fish pushed one another out of the water high-and-dry upon the pebbles. Each, with its head up-stream, struggled, fought, and scuffled for precedence. With one's hands only, or, more easily, by employing a gaff or a crook-stick, tons of salmon could have been procured by the simple process of hooking them out.

It seems to me that thousands of the salmon ascending these small mountain-streams never can spawn from sheer want of room, or, if they do, it must be under most unfavourable circumstances. At the end of the pebble-stream was a waterfall, beyond which no fish could by any possibility pass. Having arrived at this barrier to all farther progress, there they obstinately remained. Weeks were spent in watching them, but I never, in a single instance, saw one turn back and endeavour to seek a more congenial watercourse; but, crowded from behind by fresh arrivals, they died by the score, and, drifting slowly along, in time reached the larger

stream. It was a strange and novel sight to see three moving lines of fish—the dead and dying in the eddies and slack-water along the banks, the living, breasting the current in the centre, blindly pressing on to perish like their kindred.

Even in streams where a successful deposition of the ova has been accomplished, there never appears, as far as my observations have gone, any disposition in the parent-fish to return to the sea. Their instinct still prompts them to keep swimming up-stream, until you often find them with their noses worn quite off, their heads bruised and battered, fins and tail ragged and torn, bodies emaciated, thin, and flabby; the bright silvery tints dull and leaden in hue, a livid red streak extending along each side from head to tail, in which large ulcerous sores have eaten into the very vitals.

The Indians say all the salmon that come up to spawn die; but if ~~do~~ do not die, I have no hesitation in saying that very few spring-salmon ever reach the saltwater after ascending the rivers to spawn. Why there should be this marvellous waste of salmon in the rivers of the North-west I am somewhat puzzled to imagine. The distance the fish have to travel from the sea

up-stream, or the obstacles they may have to overcome, have clearly nothing to do with their dying. In the Chilukweyuk river the distance from the sea is not over 200 miles, and that clear from any kind of hindrance; and yet they die in thousands. In the Columbia they ascend a thousand miles to the Kettle Falls, and they have been caught many hundred miles above that; still they die just the same as in the shorter streams. Up the Snake river they push their way to the great Shoshopce Falls, over a thousand miles against a rocky stream, but perish there just as they do in the Sumass and Chilukweyuk rivers, which are close to the sea.

Unlike the salmon in our own streams, the spring-salmon in North-western waters spawn in midsummer, when the water is at its lowest temperature and greatest flood-height, from the melting snow. As there is no impediment or hindrance to prevent them returning to the sea, why do they die in N.W. waters? In my opinion, from sheer starvation. Careful observations, made at various Indian fishing-stations and extending over a long space of time, have quite convinced me that salmon (I more particularly allude to the spring-fish) never feed after leaving saltwater. My reasons for thus thinking are, first, no salmon

(as far as I know) has ever been tempted to take a bait of any kind in the fresh water above the tideway. The Indians all say that salmon never eat when in the *rivers*; and I could never discover that they had any recorded instance, or even tradition, of a salmon being taken with bait.

I tried every lure I could think of, to tempt these lordly salmon. The most killing salmon-flies of Scotch, Irish, and English ties, thrown in the most approved fashion, were trailed close to their noses; such flies as would have coaxed any old experienced salmon in the civilised world of waters to forget his caution. Hooks, cunningly baited with live fish, aquatic larvæ, and winged insects, were scorned, and not even honoured with a sniff. Others of the Commission also tried their powers of fascination, but with equally unsuccessful results.

I have opened a very large number of salmon at various Indian fishing-stations, on their first arrival, and during every stage of their wasting vitality, and after death had ended their sufferings; and not in a solitary instance did I ever discover the trace of food in the stomach or intestinal canal. But in every case where a salmon was taken in the tideway or saltwater,

I invariably found the remains of small fish and marine animals in its stomach; and in the estuaries and long inland canals that so strangely intersect the coast-line of British Columbia, salmon are readily and easily caught with hook and line; clearly showing to my mind, that whilst in salt and brackish water the North-western spring-salmon feed and fatten, but, after quitting their ocean-haunts for the cold fresh-water, they starve, waste, and die, as a lamp goes out from sheer want of oil. Surely, where hundreds of salmon are split in a day, as at the Kettle Falls, it is fair to assume that if they took any food, by chance a fish would be caught immediately after its meal, with enough evidence in the stomach to prove the fact of having broken its fast; but such proof is never discoverable. Digestion would scarcely be more rapid in the rivers than it is in the ocean and estuary, where we know they eat. Open a salmon and examine its stomach at any time, caught either in nets or with hook and line, and food in various stages of digestion will be invariably found.

Another proof that they undergo a rigid and persistent lent is found in the rapid wasting of all the tissues that goes on during their sojourn

in fresh-water. Allowing for the consumption of material requisite for the purposes of reproduction, and the wear-and-tear consequent on making their way up stiff currents, leaping falls, and laboriously toiling up rocky *canions*—still I content, if only a partial equivalent was resupplied in the shape of food, waste would not go on to the actual death of the muscles, that slough away in large pieces, as the exhausted fish makes feeble efforts to struggle on; dying at last a loathsome mass of rotting animal matter.

Sores, in both male and female fish, often arise from injuries inflicted by the teeth of a jealous adversary; but these wounds are utterly different from the sloughing ulcer, arising, as I believe, from sheer lack of vital force. These salmon veritably consume themselves, and perish, when life's stove burns out, for want of fuel to keep it alight.

In August the Chilukweyuk river became perfectly unendurable from the quantities of dead fish floating down. I had with me a splendid retriever, that, to my disgust and annoyance, used to amuse himself, during my absence from the tent, by swimming in after the floating salmon, bringing them ashore, and safely storing them in my

canvas dwelling; and on my return I used to discover a heap of fish, the stench from which was beyond human endurance. If fastened out from the tent, he piled them up at the door: all the lessons bestowed on him failed to convince him of his folly; he stuck to his disagreeable habit with a perseverance worthy of a better cause.

Arriving a little later than the preceding, is a smaller fish, which I believe to be the *Salmo paucidens* (Weak-Toothed Salmon) of Sir J. Richardson, F. B. A., p. 223; the *red charr* of Lewis and Clark, but the red they allude to is a colour every one of the different species acquire after being a short time in the rivers.

This fish seldom attains a weight over from three to five pounds, and is called by the Indians, at the salmon-leap at Colville on the Columbia, *stzoin*; it is a very handsome fish, back nearly straight, a light sea-greenish colour; sides and belly silvery-white, tail very forked, fins and tail devoid of any spots; the teeth are wide apart, and not strongly implanted. I was disposed at first to think they were the *young* of some other species; but the Indians are positive they are not, and they spawn much as the others do. In a small stream or tributary to the Chilukweyuk river, a mountain-torrent

on the west side of the Cascades flowing into the Fraser, on the banks of which I was for a long time entamped, and up which the salmon come in great numbers, I amused myself watching this species of salmon (*Salmo paucidens*) deposit their spawn. It was in August, the water clear as crystal, the bottom a fine brown gravel. A trench, that looked about three or four inches deep and three feet long, was muzzled out by the noses of the females. A female fish poised herself over the trench, head up-stream, and by a rapid vibration of her fins kept herself nearly still; this lasted about a minute and a half or two minutes, during which time a quantity of ova were deposited. She then darted off like an arrow; four males at once took her place over the spawn-bed, and remained, just as the female had done, about two minutes. On their leaving two females came, and were followed by the males, as before. The water was about four feet deep. I am quite sure, from often watching these streams, that one spawning-bed is used by a great many males and females: it was both curious and interesting to watch the extreme regularity with which the sexes succeeded each other.

The question as to what becomes of the young

salmon after leaving the egg, is a query more easily asked than answered. There are no snug breeding-ponds, no cosy little aquariums or water-nurseries, where the baby-salmon may be watched and carefully tended until, honoured with a badge, it is sent away to travel through pelagic meadows, deep-sea forests, and ocean gardens, where, growing rapidly, bigger if not wiser, it returns to tell how long it has been away, and how rapidly it has grown. Assistance such as this falls not to the lot of the hunter-naturalist, who with prying eye peers, searches, and grubs about on the banks and into the depths of the lakes and mountain-torrents, in this far-western wilderness. Had he the eyes of Argus, he could only register a few hasty observations, and generalise on their value: he has no opportunities for investigations, such as they have, who at home can watch the egg in their very parlours, gradually shaping itself into the quaint little salmon; see it come from out the egg-case with its haversack of provender, wonderfully provided to supply its wants, until able to live by its own teeth and industry; track its growth and habits through its youthful days; then, marking it with a leaden medal, send it off to sea, to welcome it back after its wanderings a full-grown salmon.

It may be that Creative wisdom has implanted the same instinct in the North-western salmon, prompting it to obey similar laws, and follow the same routine as to the exodus seaward, and return to fresh-water, as directs it in our native streams: my own impression is, that the fish spawned in midsummer or autumn remain up in the lakes and deep still river-pools until the following summer freshets, when they take their departure for the sea as the fresh-run salmon come. I think so, because in the Sumass and Chilukweyuk lakes, already spoken of; along the banks of the Fraser river, and in the Osoyoos lakes and tributaries to the Columbia river, I have in September and October observed large shoals of what I believed to be young salmon, that disappear when the snow begins to melt during June and July in the following summer. I suspect the first flood carries them down and out to sea; but, after all, this is but surmise, and of little practical value.

I never caught salmon-fry whilst fishing for trout, as we could so easily do in our streams; and it is just possible that the rapid rise (unlike anything we know of in our streams) that takes place in every river, brook, and rivulet during midsummer, when the snow melts on the hills, reducing

the temperature of the water down to freezing-point, may send the young salmon-fry into the saltwater at a very early period of its life. 'At three days old he is nearly two grains in weight; at 16 months old he has increased to two ounces, or 480 times its first weight; at 20 months old, after the smolt has been a few months in the sea, it becomes a grilse of $8\frac{1}{2}$ lbs., having increased 68 times in three or four months; at $2\frac{3}{4}$ years old it becomes a salmon of from 12 to 15 lbs. weight, after which its increased rate of growth has not been ascertained; but by the time it becomes 30 lbs. in weight, it has increased 115,200 times the weight it was at first.'* These smolts that I have seen in shoals were about half an ounce in weight, the produce of the summer's spawning. As I have stated, they disappear when the floods set in; and nothing more is seen of them until they return salmon of various sizes, from 2 lbs. to 75 lbs., or, as I believe, the Quinnat and Stzoin.

The next salmon in importance, as affording food to the Indians, is called by them at the Kettle Falls *cha-cha-lool*, and arrives with the quinnat. This is unquestionably a fully-matured fish, and a distinct species, answering in many par-

* Buckland's Manual, 'Salmon Hatching,' page 24.

ticulars to the *Salmo Gairdneri* of Sir J. Richardson, F. B. A., 'Fishes,' p. 221; it will be as well to retain that name. It may be readily distinguished from the quinnat by its rounded blunt-looking nose, shorter and much thicker head, straighter back, and more slender figure—the tail not nearly as much forked. The entire colour of the back is much lighter, and thickly freckled, as are the fins and tail, with oval black spots. The average weight of the *cha-cha-lool* is from 8 to 11 lbs. This salmon is common in the Fraser, Chilukweyuk, and Sumass rivers, and in every stream along the mainland and island coasts up which salmon ascend. When they first arrive the flesh is most delicious—fat, pink, and firm withal, and to my palate finer than that of the mammoth quinnat. The Indians also prize these salmon, and pack them when dried in bales apart from the others.

Salmo Gairdneri and *S. quinnat* are the spring salmon, but the autumn has also its supply of 'swimming silver,' quite equal to that of spring in point of numbers, but inferior in quality. Up the Columbia in October to the Kettle Falls, and somewhat earlier in the Fraser and rivers north of it, comes an ugly, unprepossessing, hook-nosed, dingy-looking salmon, called by

the Colville Indians *Keasoo*, by the Chinooks *Ekewan*, by the Clallams *Kutch-kutch* — the *Hooked Snout* of the fur-traders, *Salmo lycaodon* of Pallas, *Zoog. Russ. Asiat.*

When fresh-run, this fish in colour is of a silvery-grey lustre ; back, overshot with a greenish hue ; belly, silvery-white ; no spots on either the back or sides. The hooked nose, said to be peculiar to the male fish after spawning, is a well-marked, constant, and specific character in every fresh-run fish, the females having at all times symmetrical jaws. I found, from carefully observing great numbers of these fresh-run males, that the hooked state of the snout differs very materially in fish arriving at the same period ; and I am quite convinced that large numbers of these salmon do get back again to the saltwater after spawning, and that the strange change that takes place in the hooking over of the snout and growth of the teeth, during their sojourn in the rivers, remains a permanent mark ; and the vast difference observable in the males, at the time of arrival, is simply attributable to the fact, that those having the large fanglike teeth and tremendously crooked snout are such as have been up the rivers perhaps the year before, or, it may be, long prior to that period.

In every stream and rill, where they can by any possibility work a passage, you find these salmon; they remain until January and February in the succeeding year, becoming fearfully emaciated and worn, from a long and tedious abstinence; for I believe these salmon feed sparingly, if at all, after leaving the sea. The fish in January is of a pale dirty-yellow colour; the sides, showing a bright purplish stripe (sure sign of waning vitality), are flattened and compressed; the back is straight until near its posterior third, when it dips down suddenly, and rises again at the tail just as if you had cut a notch out. The belly, instead of being silvery-white, is rusty yellow, and hangs pendulous and flabby; the eye is dull and sunken.

But the most curious change is in the head of the male fish: the nose becomes enormously elongated, and hooks down like a gaff-hook over the under-jaw, and the under-jaw bends up at the point into a kind of spike that fits into a regular sheath or hole in the upper jaw, just where it begins bending into the hook-like point; the teeth become regular fangs, sticking out round the jaws at irregular distances, and having a yellow bonelike appearance. I have often seen the teeth more than half an inch

in length. It is quite clear that these teeth grow during the time the fish remain in fresh-water; no shrinking of the gums could account for such a length of tooth; and their use, I believe, is for fighting.

My own observations lead me to assume that at least there are eight or ten males to every female; and as one spawning-bed is used by many females, terrible battles ensue between the males as to which shall impregnate the ova; and it would appear, reasoning from analogy, that the same law holds good with fish as with gregarious mammals and birds—the stronger and more able male always begets the offspring. I hardly think the ova of a female fresh-run salmon, impregnated by the milt of an old and spent male fish, would produce as strong and healthy an offspring as the male fat, fresh, vigorous, and healthy. I cannot help thinking there must have been some purpose—as antlers are given to the deer tribes, spurs to the males of gregarious birds, and like examples—in giving such formidable weapons to these salmon during their breeding-time; and why not the reason above stated?

Quoting from Dr. Scouler: 'Observatory Inlet (which I should imagine to be just such an inlet

as Puget's Sound) was frequented at the time by such myriads of the salmon, that a stone could not have reached the bottom without touching several individuals—their abundance surpassing imagination to conceive.' He goes on to say, that in a little brook they killed sixty with their boarding-pikes. Then, he says, the hump before the dorsal fin consists of fat, and appears to be peculiar to the males, who acquire it after spawning-time, when their snouts become elongated and arched.

The Fall-salmon (*Salmo lycaodon*) differ most extraordinarily at different periods of their growth—so much so, that I quite believed the adult, middle-aged, and young were three distinct and well-marked species; but Dr. A. Günther has very kindly investigated the matter, and knocked my three species into one.

Indians take the young of this salmon in large numbers in the bays, harbours, and fiord-like inlets surrounding the island, and along the British Columbian and Oregon coasts; also in the Sumass, Chilukweyuk, and Sweltza rivers, and indeed in all inland lakes that are accessible to fish from the sea. These handsome, troutlike young salmon are easily caught with bait of any kind; they rise readily to a gaudy fly, and seize even

a piece of their brethren if carefully tied round a hook; from six ounces to a pound is about the average size. When they go to sea again from the lakes I had no opportunity of proving, but I imagine they go down with the floods, as the spring salmon come up.

The second form in which I mistook it for a distinct species is that of the Humpbacked Salmon (*Salmo proteus*, Pallas; *Salmo gibber*, Suckley; 'gerbuscha,' Kamtschatka; 'hud-do' of the Nesqually Indians; 'hun-num' of the Fraser river Indians). In its general outline it differs altogether from the Hook-nosed Salmon. The back is much more arched; nose curved, but not nearly as much as in the mature *Salmo lycaodon*, and the under-jaw turns up and terminates in a protuberance or knob; teeth much more numerous, sharper, and smaller; tail deeply notched, and thickly spotted with dark oval-shaped marks. The most conspicuous feature is a large hump of adipose material situated on the shoulders, a little anterior to the dorsal fin, and only found in the male fish. It has generally been stated that this hump grows upon the male fish after entering the fresh-water: this is a mistake, for I have seen them again and again taken in the sea, before going up into the rivers, with

this hump well developed. On cutting it open, it appears to be a sort of cellular membrane, filled with an oily, semifluid kind of material. The use of this deposit, there can be no doubt, is to supply the male with this material in some mysterious way during the spawning-time, for, after that period has passed, the hump entirely disappears. They arrive about the same time as the older fish, but only in very large runs every second year—have the same range, and die in thousands.

At Fort Hope, on the Fraser river, in the month of September, I was going trout-fishing in a beautiful stream, the Qua-que-alla, that comes thundering and dancing down the Cascade Mountains, cold and clear as crystal; these salmon were then toiling up in thousands, and were so thick in the ford that I had great trouble to ride my horse through; the salmon were in such numbers about his legs as to impede his progress, and frightened him so, that he plunged viciously and very nearly had me off. They are never at any time good eating; the flesh, in fresh-run fish, is white, soft, and tasteless. The Indians only eat them when they are unable to obtain anything else. These salmon work up to the very heads of the tributaries, and

I have often seen them where the water was so shallow as to leave their backs uncovered.

The *Salmo canis* of Suckley (Dog-Salmon, Spotted Salmon, 'Natural History of Washington Territory,' p. 341), which he says arrives at Puget's Sound in September and October, I believe to be only the old males of the *Salmo lycaodon* (Hook-nosed Salmon), that have had a turn in the rivers perhaps a year or two before, and have got safely back again to the sea, recruited their wasted energies, and returned again for another perilous cruise up the streams. The large fanglike teeth, from which they derive the name of dog-salmon, are the large teeth grown and developed, as I have previously described them, whilst spawning in the fresh water.

Salmon is of the most vital importance to the Indians; deprived or by any means cut off from obtaining it, starve to death they must; and were we at war with the Redskins, we need only cut them off from their salmon-fisheries to have them completely at our mercy. If salmon-fisheries—well managed, and conducted by persons who thoroughly understood salting, barreling, and curing salmon—were established on some of the tributaries to the Fraser and Columbia rivers, I am quite convinced they would pay handsomely.

Some few attempts have been made by speculators, but always failed for want of capital and proper management. The Hudson's Bay Company, in some of their inland and northern posts, feed their *employés* on dried salmon during the winter. At Fort Langley, on the Fraser river, the Company generally *salt in* several hundred casks of salmon, and these principally go to the Sandwich Islands or to China. There was one large salmon-curing establishment at the mouth of the Puyallup river, but I have been told it did not pay; the fish, being badly put up and carelessly packed, often spoiled before reaching the markets for which they were destined. In Victoria, salmon is now a very important article both of food and commerce.

CHAPTER III.

FISH HARVESTING.

THE systems adopted by the Indians for capturing salmon vary in accordance with the localities chosen for fishing. Besides the stages or baskets in use on the Columbia river, they construct weirs reaching from one side of a stream to the other, with skilfully-contrived openings, allowing fish to pass easily through them into large lateral stores made of closely-woven wicker, where they are kept prisoners until required.

They have rather a clever contrivance for catching salmon in the bays and harbours, using a sort of gill-net (a net about forty feet long and eight feet wide), with large meshes; the upper edge is buoyed by bits of dry cedar-wood, that act as floats, and the net kept tight by small pebbles slung at four-foot distances along the lower margin. This kind of net the Indians stretch across the mouth of a small bay or inlet, and sit in their canoes a short distance

off, quietly watching it. These small bays, or saltwater aquariums, are the lurking-places and strongholds for shoals of anchovies and herrings. Often tempted to wander and make excursions beyond the gateway of their rocky home, they are at once spied by predatory piratical salmon; seeking safety in flight, they dash headlong for their hiding-place, hotly pursued by their dreaded foe, and shooting easily through the cordy snare, laugh to see Master Salmon 'run his head into the net;' bob-bob go the floats beneath the surface, up paddles redskin, hauls up his net, clutches the silvery pirate, and with a short heavy club gives him a blow on the head, drops him into the canoe, lets go his net, and waits for the next.

With this kind of net immense numbers of spring and fall salmon are taken. All their nets are made of cord, spun from native hemp, that grows abundantly along the banks of the Fraser and other streams. Squaws gather the plant about a week before the flowering-time; first soak, then beat it into fibre; this, arranged in regular lengths, is handed to the Indian, who, seated on the ground, twists the bundles of tiffled hemp into cord—a cord as regular and symmetrical as the handiwork of a practised

ropemaker—using neither tools nor machinery, but simply the hand and naked thigh.

The first salmon entering the Columbia are taken at Chinook Point, a short distance above Cape Disappointment, near the mouth of the river. These are known as 'Chinook salmon,' and are celebrated, not only in the immediate neighbourhood but in the markets of San Francisco, as the fattest and finest-flavoured salmon taken on the coast; they are large, ranging from 35lbs. to 70lbs. in weight.

In June the grand army arrives. We need not linger at the old fishery of the Chinook Indians, so prosperous fifty years ago. The Indians have disappeared; but the salmon army marches on, with little interruption, until they have arrived at the Cascades.

Here we must remain awhile, and see for ourselves how the red man harvests his salmon. Salmon is quite as essential to the Indians residing inland as grain to us, or bananas and plantains to the residents in the tropics: gleanings the regular supply of fish, the Indian literally harvests and garners it as we reap our grain-crops. It cannot be by mere chance that fish are prompted, by an unalterable instinct, to thread their way into the farthest recesses of the moun-

tains—fish too that are fat and oily, and best adapted to supply heat and the elements of nutrition.

The winters are long and intensely cold, often 30° Fahr. below zero, the snow lying deep for at least six months. Birds migrate, most of the rodents and the bears hybernate, and such animals as remain to brave the biting cold, retire where it is very difficult and often impossible to hunt or trap them. In a small lodge, made of hides or rushes, as far from windproof as a sieve would be; wrapped in miserable mantles (simply skins sewn together, or ragged blankets, bought of the Hudson's Bay Company), cowering and shivering over the smouldering logs, are a family of savages. The nipping blasts and icy cold forbid their venturing in pursuit of food; flesh they could not cure during the summer, for they have not salt, and sun-drying is insufficient to preserve it. A miserable death, starved alike by cold and hunger, must be the fate of this, and of all Indian families away from the seaboard, but for salmon: sun-dried, it preserves its heat and flesh-yielding qualities unimpaired; uncooked, they chew it all day long, and frequently grow fat during their quasi-hybernation. The waterways are thus made available for the

transport of coals and provisions necessary to keep the life-stove burning, floated free of freight up to the very doors of the Indian's wigwam. The way he harvests this store, and preserves it for winter use, we shall see as we follow the course of the salmon in their ascent of the Columbia river.

The Cascades, where the salmon first meet with a hindrance to their upward course, is a lovely spot. The vast river here breaks its way through the Cascade Mountains, a mountain-gap unequalled, I should say, in depth and extent, by any in the world. Some parts are massive walls of rock, and others wooded slopes like to a narrow valley. One can hardly imagine the possibility of so great a change in climate, and consequently vegetation, as there is betwixt this place and the Dalles, only a few miles farther up the river. I have left the Dalles when the ground was covered with snow, and within a distance of forty miles entered this gap, and found the climate to be that of summer. The sloping forests brightly green, shrubs of various sorts, tropical in appearance, immense ferns, the emerald moss clothing the rocks, over which dozens of waterfalls, unbroken for a thousand feet, tumble from the hills into the river

—all together make up a scene of beauty and rich luxuriance, unlike any other part of the river.

From the Dalles to the Cascades the river has scarcely a perceptible current, either side being bounded by perpendicular walls of mountains. Tradition says, that once the river had a uniformly swift course the entire way, and that where the Cascades now are, the water passed at that time under a huge arch that reached from side to side. Afterwards an earthquake tumbled it down, the ruins of the arch still existing as a chain of islands across the head of the rapids; the river, having gradually carried away the fragments, forming now the long rapid. The river, thus suddenly thrown back, flooded the forests up to the Dalles, and to this day stumps of trees are to be seen sticking out of the water many hundred yards from the shore.

Below the Cascades, before reaching the flat district about Fort Vancouver, the scenery is bold and massive; immense hills densely wooded, bold promontories, and grassy glades are passed successively as the steamer dashes on her downward trip. At the Cascades there is now a railway, over which goods and passengers are conveyed to the steamers above the rapids, which

are so swift that canoes plied by experienced Indians dare not venture to run them.

Wandering along by this foaming rush of water, one sees numberless scaffoldings erected amongst the boulders—rude clumsy contrivances, constructed of poles jammed between large stones, and lashed with ropes of bark to other poles, that cross each other to form stages. Indian lodges, pitched in the most picturesque and lovely spots imaginable, are dotted along from one end of the rapids to the other. Indians from long distances and of several tribes have come here to await the arrival of the salmon.

Leaning against the trees, or supported by the lodges, are numbers of small round nets (like we catch shrimps with in rocky pools), fastened to handles forty and fifty feet in length. Hollow places are cunningly enclosed, with low walls of boulders, on the river-side of each stage.

It is early in June; the salmon have arrived, and a busy scene it is. On every stage plying their nets are Indian fishers, guiltless of garments save a piece of cloth tied round the waist. Ascending the rapids, salmon seek the slack-waters at the edges of the current, and are fond of lingering in the wake of a rock or any convenient hollow; the rock-basins constructed

by the sides of the stages are just the places for idling and resting. This the crafty fisher turns to good account, and skilfully catches the loiterer by plunging his net into the pool at its head, and letting the current sweep it down, thus *hooping* salmon after salmon, with a certainty astounding to a looker-on. Thirty salmon an hour is not an unusual take for two skilled Indians to land on a stage. As soon as one gets tired, another takes his place, so that the nets are never idle during the 'run.'

The instant a fish reaches the stage, a heavy blow on the head stops its flapping; boys and girls are waiting to seize and carry it ashore, to be split and cured—a process I can better describe when at the salmon-falls. As there is at the Cascades simply hindrance to the salmon's ascent, of course vast numbers escape the redskins' nets.

Forty miles above this fishery is another obstruction, the Dalles; where the river forces its way through a mass of basaltic rocks in numerous channels, some of them appearing as if hewn by human hands. Another portage has to be made here, a neat little town having grown up in consequence of the transshipment. The journey from steamer to steamer is accomplished in stages, the heavy goods being hauled by mule

and ox-teams. The road lies over a steep ridge of hills to the junction of the Des Chutes, or 'Fall river,' with the Columbia. Fishing at the Dalles is much the same as at the Cascades.

Great numbers of salmon turn off and ascend the Snake river, to be captured at the Great Shoshonee Falls by the Snake and Bannock Indians. We follow on the vanguard of the swimming army, passing numberless tributaries, up which detachments make their way, right and left, into the heart of the country—supplies for tribes living near the different streams—to the great falls of the Columbia, the 'Kettle Falls;'^{*} why so named is not very clear. These falls, except when the river is at its highest flood, form an impassable barrier to the salmon's progress; the distance from the sea is about 700 miles, and the first arrivals are usually about the middle of June.

The winter-quarters of the Boundary Commission were about two miles above the falls, and close to the falls is a trading-post of the Hudson's Bay Company, Fort Colville. The gravelly plateau on which the trading-post stands, together with one or two houses belonging to old employés, was clearly once a lake-bottom. The water at some remote period filling the lake ap-

^{*} *Vide Illustration.*

pears to have broken its way out through the rocks at the falls, and left this flat dry land. Patches of wheat and barley are grown, but the soil is far too poor to repay the labour of cultivation.

About three weeks preceding the arrival of the salmon, Indians begin to assemble from all directions. Cavalcades may be seen, day after day, winding their way down the plain; and as the savage when he travels takes with him all his worldly wealth—wives, children, dogs, horses, lodges, weapons, and skins—the turn-out is rather novel. The smaller children are packed with the baggage on the backs of horses, which are driven by the squaws, who always ride astride like the men. The elder girls and boys, three or four on a horse, ride with their mothers, whilst the men and stouter youths drive the bands of horses that run loose ahead of the procession. A pack of prick-eared curs, simply tamed prairie-wolves, are always in attendance.

A level piece of ground overlooking the falls (the descent from which to the rocks is by a zig-zag path, down a nearly vertical cliff) is rapidly covered with lodges of all shapes and sizes. The squaws do the work appertaining to camping, and are literally 'hewers of wood and drawers of water.' The men, who are all, when at the fish-

ery, under one chief, whom they designate the 'Salmon Chief,' at once commence work—some in repairing the drying-sheds, which are placed on the rocks (as are also numbers of lodges) at the foot of the zigzag; others are busy making or mending immense wicker hampers, about thirty feet in circumference, and twelve feet in depth. Little groups are dragging down huge trees lopped clear of their branches—rolling, twisting, and tumbling them over the rocks, to be fixed at last by massive boulders, the ends hanging over the foaming water not unlike so many gibbets. These trees being secure and in their right places, the next work is to hang the wicker baskets to them, which is a risky and most difficult job: but many willing hands and long experience work wonders; with strong ropes of twisted bark, the baskets are at last securely suspended. By this time the river begins to flood rapidly, and soon washes over the rocks where the trees are fastened, and into the basket, which is soon in the midst of the waterfall, being so contrived as to be easily accessible from the rocks not overwashed by the flood.

Whilst awaiting the coming salmon, the scene is one great revel: horse-racing, gambling, love-making, dancing, and diversions of all sorts,

occupy the singular assembly; for at these annual gatherings, when all jointly labour in catching and curing the winter supply of salmon, feuds and dislikes are for the time laid by, or, as they figuratively express it, 'The hatchet is buried.'

The medicine-men (doctors and conjurors) of the different tribes busily work their charms and incantations to insure an abundant run of fish. One of the illustrations is drawn from a photograph of the falls. The Indians at first steadily refused to allow the photographer and his machine to come near the falls, declaring it a box of bad 'medicine' that would surely drive every salmon away; and not until an old Romish priest who was at the trading-post explained it to them, did they permit a photograph to be taken.

The watchers announce the welcome tidings of the salmon arrival, and the business begins. The baskets are hung in places where past experience has taught the Indians salmon generally leap, in their attempts to clear the falls. The first few that arrive are frequently speafed from the rocks. They are in such vast numbers during the height of the 'run,' that one could not well throw a stone into the water at the

base of the falls without hitting a fish: fifty and more may be seen in the air at a time, leaping over the wicker traps, but, failing to clear the 'salmon-leap,' fall back, and are caged. In each basket two naked Indians are stationed all day long; and as they are under a heavy fall of water, frequent relays are necessary. Salmon (three or four at a time, in rapid succession, tumble into the basket. The Indians thrust their fingers under the gills, strike the fish on the head with a heavy club, and then fling them on the rocks. I have known three hundred salmon landed from one basket betwixt sunrise and sunset, varying in weight from twenty to seventy-five pounds.

From the heaps of fish piled on the rocks, boys and girls carry and drag them back to the squaws seated round the curing-houses; with sharp knives they rip the salmon open, twist off the head, and cleverly remove the backbone; then hanging them on poles, close under the roofs of sheds the sides of which are open, they dry them slowly, small fires being kept constantly smouldering on the floors. The smoke serves to keep away the flies, and perhaps also aids in the preservation of the fish. The only portions eaten by the Indians during the catching are the heads,

backbones, roes, and livers, which are roasted, skewered on sticks.

When thoroughly dried the fish are packed in *bales* made of rush-mats, each bale weighing about fifty pounds, the bales being tightly lashed with bark-ropes. Packing in bales of equal weight facilitates an equitable division of the take. Horses are purposely brought to carry the fish back to winter-quarters, and two bales are easily packed on each horse. The fishing-season lasts for about two months: then the spoils are divided, and the place abandoned to its wonted quietude, until the following summer brings with it another harvest.

During the drying, silicious sand is blown over the fish, and of course adheres to it. Constantly chewing this 'sanded salmon' wears the teeth as if filed down, which I at first imagined them to be, until the true cause was discovered. I have an under-jaw in my possession whereon the teeth are quite level with the bony sockets of the jaw, worn away by the flinty sand.

I question if in the world there is another spot where salmon are in greater abundance, or taken with so little labour, as at the Kettle Falls, on the Columbia river. In all streams emptying into Puget's Sound, in the Fraser river, and

rivers north of it to the Arctic Ocean, salmon ascend in prodigious abundance. In the Fraser there are no obstructions as far as Fort Hope to the salmon ascent; hence fishing is carried on by each village or family for themselves, and not by the combined labour of many, as on the Columbia. Near the mouth of the river large iron gaff-hooks are generally used; with these ugly weapons salmon are hooked into the canoes. Higher up, at the mouths of the Sumass, Chilukweyuk, and other tributary streams, they use a very ingenious kind of net worked between two canoes, with which large numbers of salmon are taken. Stages, too, are hung over the eddies from the rocks, and round nets used as at the Cascades.

On the Nanimo river the Indians have a very ingenious contrivance for taking salmon, by constructing a weir; but, instead of putting baskets, they *pave* a square place, about six feet wide and fourteen feet long, with white or light-coloured stones. This pavement is always on the lower side of the weir, leading to an opening. A stage is erected between two of these paved ways, where Indians, lying on their stomachs, can in an instant see if a salmon is traversing the white paved way. A long spear, barbed at the end, is held in readiness, and woe betide the

adventurous fish that runs the gauntlet of this perilous passage!

But the most curious contrivance I saw was at Johnson's Narrows. I have said salmon readily take a bait when in saltwater. The Indians when fishing use two spears, one about seventy feet in length; the other shorter, having a barbed end, is about twenty feet long. In a canoe thus equipped, favourable fishing-grounds are sought, the Indian having the long spear being also provided with a small hollow cone of wood, trimmed round its greater circumference with small feathers, much like a shuttlecock; this he places on the end of the longer spear, and presses it under water, until down the full length of the handle; a skilful jerk detaches this conelike affair from the spear-haft, when it wriggles up through the water like a struggling fish. The savage with the short spear intently watches this deceiver; a salmon runs at it, and it is speared like magic.

Next in importance amongst the Salmonidæ is the Oregon Brook Trout, *Fario stellatus* (Grd. Proc. Acad., Phil. Nat. Soc., viii. 219).

Specific Characters.—Head rather large, contained four-and-a-half times in the total length; maxillary reaching a vertical line drawn behind the orbit. Colour of the back bright olive-

green, sides pinkish-yellow, belly white, profusely speckled over with minute black spots.

This trout lives everywhere, and is to be met with in the lakes and rivers in Vancouver Island, in all streams flowing into Puget's Sound, and away up the western sides of the Cascades. Crossing to the eastern side, and descending into the valley of the Columbia, again he puts in an appearance. Climb the western slope of the Rocky Mountains up to the summit, 7,000 feet above the sea-level, there too he lives—always hungry and voracious. These trout are very delicious, varying from eight ounces up to three pounds in weight.

My first exploit in fishing for trout may be worth relating:—I was sitting on the bank of a stream that rippled gaily on its rocky course, down the western slope of the Rocky Mountains; and which, here and there lengthening out into a long stickle, and curling round a jutting rock, lazily idled by the grassy bank; upon leaping a sudden fall, and widening into a glassy pool. Butterflies gambolled and flitted recklessly; dragonflies clad in brilliant armour waged cruel war on the lesser forms of winged life, chasing them everywhere. The busy hum of insects, the air fragrant with the forest perfumes, the murmur of the water, and

the songs of feathered choristers made one feel happy, though far away from civilisation. My reverie was broken by a sudden splash; a speckled tyrant, lurking under the bank on which I sat, had pounced upon a large grey fly that, unconscious of danger, had touched the water with its gauzy wings. Very well, Master Trout, you may perhaps be as easily duped as your more cautious *confrère*; so setting to work, I overhauled my 'possible sack,' found a few coarse hooks, a bit of gut, and some thread.

Among other materials wherewith to make a fly, feathers were indispensable. Shouldering my gun, I strode off to look for a 'white flesher,' alias ruffed grouse; soon stirred one up, bagged him, hauled out his glossy bottle-green frill; selected some feathers which I thought would turn a decent hackle, picked out a couple of brighter ones for wings, some red wool from my blanket for dubbing, and with these materials I tied a fly. Not the slightest resemblance, fancied or real, did it bear to anything ever created, but still it was a fly, and, as I flattered myself, a great achievement. A line was made from some ends of cord; then cutting a young larch, I made my tackle fast to the end, and thus equipped sallied to the stream.

My first attempt in the swift scour was a lamentable failure. Warily I threw my newly-created monster well across the stream, and, according to the most approved method, let it slowly wash towards me, conveying to the rod and line a delicate and tempting tremble; not a rise, not a nibble; my hopes wavered, and I began to think these trout wiser than I had given them credit for. I tried the pool as a last chance; so, leaning over the rock, I let my tempter drop into the water; it made a splash like throwing in a stone; but imagine my delight, ye lovers of the gentle art, when a tremendous jerk told me I had one hooked and struggling to get free! Depending on the strength of my tackle, I flung him out on the bank; and admitting all that may be said against me as being barbarous and cruel, I confess to standing over the dying fish, and admiring his brilliant colour, handsome shape, fair proportion—and, last thought not least, contemplated eating him! I pitied him not as, flapping and struggling on the grass, his life ebbed away, but thought only of the skill I had displayed in duping him, and the feast in store for me on returning to camp.

Having discovered a secret, I pressed eagerly on to turn it to the best advantage, and that

day played havoc amongst the trouts. Some long willow-branches, cut with a crook at the end, served me in lieu of a basket. Passing the sticks under the gill-covers, and out at the mouth, I strung trout after trout until the sticks were filled; then tying the ends together, flung them across my shoulder and trudged along; a good plan when you have not a basket. I now turned my attention, and devoted all my ingenuity, to the manufacture of a more angler-like fly; and in this case the adage proved true, 'that a poor original was better than a good imitation.' My well-dressed fly was not one-half as much appreciated as the old one; there was a sham gentility about him that evidently led at once to suspicion, and it was only here and there I met with a fish weak enough to fall a victim to his polished exterior; I therefore abandoned the dandy, and returned again to the rough old red-shirted 'trapper' with which I first commenced.

There was a stream in which I had better sport than in any of the others, the Mooyee, on the western slope of the Rocky Mountains—a small stream, ~~very~~ rocky, clear as crystal, icy cold, and so densely wooded on each side that fishing in it, unless by wading, was impossible. I remember

one pool as being particularly productive — a rock-basin, with a little rivulet dancing into it through a pebbly reach; the water so beautifully clear, that everything in the pool was visible, as though one looked into an aquarium. I could not help standing and feasting my eyes on the trout playing about in it. To say the pool was full of fish is no exaggeration; all, with their heads toward the little stream, were gently sculling their tails to steady themselves. I gazed upon a mass of fish, big and little, from four ounces to three pounds in weight.

Having sufficiently indulged in admiring this host of trout (the like of which I had never seen before), I began the war. Dropping my 'sensation-fly' into the little stream, I let it sink and drift into the pool. Twenty open mouths rushed at it ravenously, and trout after trout was rapidly landed on the shingle. I continued this scheme until a heap of magnificent fish were piled at my side, and the pool was rapidly thinning. One crafty old fellow, however, that looked about three pounds in weight, defied all my efforts to tempt him. I let the fly drift over him, under his nose, above his nose; but he scorned it, and, if he could, I felt he would have winked his eye derisively at me.

To have him I was determined: so sitting down, I scooped out the eye of a fish, and put it on the point of the flyhook, then ~~let~~ it drift down the stream and into the pool; steadily it neared his nose, and in breathless expectation I awaited the result. He was evidently uneasy, and knew not what to do. It floated past him, and I thought my bait had failed; when round he turned, and dashing viciously at it, seized (pardon the joke) the hook and eye, and I had him fast. Being far too heavy to risk jerking, I let him get over his furious fit, then towed him ashore; hand over hand gathering up my line, I got close to him, and seizing him behind the gills, brought him upon the shingle; and a beauty he was!

I have tried various expedients—more as experiments than anything else—to find out what bait these trout really preferred. Grasshoppers they took readily, and I have often caught a trout when only one leg of the insect remained on the hook; the white meat from the tail of the river crayfish is also a very favourite diet. Earthworms I could not try, because they do not exist in British Columbia. But all my trials and experiments failed signally in discovering anything that could at all compare with my 'first fly.'

The trout spawn about October, or perhaps a little later, depositing their ova in gravel in the lesser streams.

SALMON TROUT:—*Salmo spectabilis* (Red-spotted Salmon Trout), Grd. Proc. Acad., Nat. Soc. Phila., viii. 218.—*Sp. Ch.*: Head a trifle more than a fourth of the total length; maxillary extending to a vertical line drawn posterior to the orbit. Colour of the back dark-greenish, inclining to grey, a lighter shade of the same colour on the sides—beneath silvery-white; thickly marked above the lateral line with yellowish spots, interspersed with others that are bright red.

In habits and distribution the salmon-trout differs in every respect from the preceding. There can be no doubt that this fish is anadromous, and comes up into the rivers to spawn at particular periods of the year, like the salmon, and then returns to sea. In October the great run begins. Into all the rivers emptying into Puget's Sound—the Dwamish, Nesqually, Puyallup, and several others, up the Fraser and its tributaries, into all the creeks and inlets about Vancouver Island, crowd in shoal after shoal. They vary in size; I have seldom seen them exceed three pounds in weight.

The advent of these trout is the signal for a

general Indian fish-harvest. The banks of all the little streams are soon dotted with temporary lodges, and every one, from the naked little urchin to the stalwart chief, wages war upon these fish. All sorts of expedients are used to snare them. Boys, girls, and old squaws catch them with a hook and line, about eight or ten feet long, tied to the end of a short stick. The hook (made of bone or hard wood) is baited with salmon-roë. The Indians never use the roë fresh; dried in the sun it becomes extremely tough, and acquires a very rank oily smell. The fish take it greedily, and in this manner large numbers are captured.

Another bait equally fatal is made by cutting a small strip from the belly of a trout, and keeping the shiny part outermost—winding it tightly round the hook, from the barb, to about an inch up the line, securing it by twisting white horsehair closely round it. A small pebble is slung about a foot from the baited hook, and the line tied to the canoe-paddle close to the hand; paddling slowly along, this bait is trolled after the canoe. The intention is manifestly to imitate a small fish, as we troll with minnow or spoon-bait in our waters. All the larger fish are generally taken in this way. They rise readily to a gaudy fly, and afford admirable sport.

But the great haul of hauls is effected by a most ingeniously-contrived basket, in principle the same as our eel-baskets. It is made of split vine-maple, lashed together with strips of cedar-bark. These baskets vary in size; some of them are fifteen feet long, and six in circumference. The crafty savages place their wicker traps in the centre of the stream; a dam of latticework on each side reaches to the bank, so that no fish can get up-stream unless through the trap. Another plan, and a very good one where the water is shallow, is to build a little wall of boulders, rising about a foot above water, slanting the wall obliquely until the ends meet in the centre of the stream at an acute angle; at this point they place the basket. By this plan all the water is forced through the basket, increasing the depth and strength of the current. In happy ignorance of their danger, the fish ply steadily up-current, until they suddenly find themselves caged.

When a sufficient number of fish are in the basket, an empty one is carried out and set, the other brought ashore; its contents are turned out upon the grass. Squaws, old and young, knife in hand, squat round, looking eagerly on; and as the captives lie flapping on the sward, in the harpies rush, seize a trout, rip him up, remove the inside,

and then skewer him open with two sticks. Poles, having a fork at the end, are placed firmly in the ground, about fifteen feet apart. Other sticks, barked and rubbed very smooth, are placed in these forked ends, on which the split trout are strung. Small fires are kept smouldering below the strung-up fish. When thoroughly dry, they are packed in small bales, and lashed with the bark of the cedar-tree.

CANDLE-FISH.—The Candle-fish or Eulachon, *Salmo (mallotus) Pacificus*, Rich. F. B. A., p. 227; *Thaleichthys Pacificus*, Grd.—*Sp. Ch.*: Head somewhat pointed and conical; mouth large, its fissure extending back to the anterior margin of the orbit; operculum terminated by a rounded angle, lower jaw projecting a little beyond the upper one; tongue rough, teeth on the pharyngeals; lower jaw, palatines, and vomer devoid of teeth; eye rather small; adipose fin, placed opposite the hind portion of the anal; scales subelliptical. Dorsal region greenish-olive colour, generally silvery-white, sparsely spotted with dirty yellow; a dark spot, nearly black, over each orbit.

A human body is a kind of locomotive furnace, that has to be kept up to a given temperature by fuel, its food. Under a tropical sun, not

much fuel is needed, and that of a sort that will not keep up a large fire. Man, therefore, wears clothes made from a vegetable fibre, and eats fruit and rice, the lowest in the scale of heat-making materials. Far north among the polar ice, where you cannot touch metal without its taking the skin off your fingers, the human locomotive is protected by thick coverings of fur: the native takes the jackets from his furry-footed companions, and covers his own skin with them. But the grand oil-springs—the locomotive's necessary coal-mines in another form—are in the bodies of the great seals and whales. Oil and blubber burn rapidly, and give out a large amount of heat. With a fur-suit outside, and inside a feed of seal's flesh washed down with seal's oil, the steam of life is kept up very easily.

But all the fat of the sea is not in the bodies of those great blubbery whales and seals. There is a fish, small in size, not larger than a smelt, that is fat beyond all description, clad in glittering silver armour, and found on the coasts of British Columbia, Russian America, Queen Charlotte and Vancouver Islands, which is called by the natives *Eulachon* or Candle-fish. I have had both leisure and opportunity to make this fish's intimate acquaintance; played the spy

upon its habits, its coming and going, and have noted how it is caught and cured.

Picture my home an Indian village, on the north shore of British Columbia. The village is prettily situated on a rocky point of land, chosen, as all Indian villages are, with an eye to prevention of surprise from concealed foes. Rearward it is guarded by a steep hill, and it commands from the front the entrance to one of those long canals, which, as I have previously stated, resemble the fiords of Norway, often running thirty or forty miles inland.

The dwellings consist of ten or fifteen rude sheds, about twenty yards long and twelve wide, built of rough cedar-planks; the roof a single slant covered with poles and rushes. Six or eight families live in each shed. Every family has its own fire on the ground, and the smoke, that must find its way out as best it can through cracks and holes (chimneys being objected to), hangs in a dense upper cloud, so that a man can only keep his head out of it by squatting on the ground: to stand up is to run a risk of suffocation. The children of all ages, in droves, naked and filthy, live under the smoke; as well as squaws, who squat round the smouldering logs; innumerable dogs, like starving wolves, prick-eared,

sore-eyed, snappish brutes, unceasingly engaged in faction-fights and sudden duels, in which the whole pack immediately takes sides. Felt, but not heard, are legions of bloodthirsty fleas, that would try their best to suck blood from a boot, and by combined exertions would soon flay alive any man with a clean and tender skin.

The moon, near its full, creeps upward from behind the hills; stars one by one are lighted in the sky—not a cloud flecks the clear blue. The Indians are busy launching their canoes, preparing war against the candle-fish, which they catch when they come to the surface to sport in the moonlight. As the rising moon now clears the shadow of the hills, her rays slant down on the green sea, just rippled by the land-breeze. And now, like a vast sheet of pearly nacre, we may see the glittering shoals of the fish—the water seems alive with them. Out glides the dusky Indian fleet, the paddles stealthily plied by hands far too experienced to let a splash be heard. There is not a whisper, not a sound, but the measured rhythm of many paddlers, as the canoes are sent flying towards the fish.

To catch them, the Indians use a monster comb or rake, a piece of pinewood from six to eight

feet long, made round for about two feet of its length, at the place of the hand-grip; the rest is flat, thick at the back, but thinning to a sharp edge, into which are driven teeth about four inches long, and an inch apart. These teeth are usually made of bone, but, when the Indian fishers can get sharp-pointed iron nails, they prefer them. One Indian sits in the stern of each canoe to paddle it along, keeping close to the shoal of fish; another, having the rounded part of the rake firmly fixed in both hands, stands with his face to the bow of the canoe, the teeth pointing sternwards. He then sweeps it through the glittering mass of fish, using all his force, and brings it to the surface teeth upwards, usually with a fish impaled, sometimes with three or four upon one tooth. The rake being brought into the canoe, a sharp rap on the back of it knocks the fish off, and then another sweep yields a similar catch.

It is wonderful to see how rapidly an Indian will fill his canoe by this rude method of fishing. The dusky forms of the savages bend over the canoes, their brawny arms sweep their toothed sickles through the shoals, stroke follows stroke in swift succession, and steadily the canoes fill

with their harvest of 'living silver.' When they have heaped as much as this frail craft will safely carry, they paddle ashore, drag the boats up on the shelving beach, overturn them as the quickest way of discharging cargo, relaunch, and go back to rake up another load. This labour goes on until the moon has set behind the mountain-peaks and the fish disappear, for it is their habit rarely to come to the surface except in the night. The sport over, we glide under the dark rocks, haul up the canoe, and lie before the log-fire to sleep long and soundly.

The next labour is that of the squaws, who have to do the curing, drying, and oil-making. Seated in a circle, they are busy stringing the fish. They do not gut or in any way clean them, but simply pass long smooth sticks through their eyes, skewering on each stick as many as it will hold, and then lashing a smaller piece transversely across the ends, to prevent the fish from slipping off the skewer. This done, next follows the drying, which is generally achieved in the thick smoke at the top of the sheds, the sticks of fish being there hung up side by side. They soon dry, and acquire a flavour of wood-smoke, which helps also to preserve them. No salt is used by Indians in any of their systems of curing fish.

When dry, the candle-fish are carefully packed in large frails made from cedar-bark or rushes, much like those one buys for a penny at Billingsgate; then they are stowed away on high stages made of poles, like a rough scaffolding. This precaution is essential, for the Indian children and dogs have an amiable weakness for catables; and as lock-and-key are unknown to the redskins, they take this way of baffling the appetites of the incorrigible pilferers. The bales are kept until required for winter. However hungry or however short of food an Indian family may be during summer-time, it seldom will break in upon the winter 'cache.'

I have never seen any fish half as fat and as good for Arctic winter-food as these little candle-fish. It is next to impossible to broil or fry them, for they melt completely into oil. Some idea of their marvellous fatness may be gleaned from the fact, that the natives use them as lamps for lighting their lodges. The fish, when dried, has a piece of rush-pith, or a strip from the inner bark of the cypress-tree (*Thuja gigantea*), drawn through it, a long round needle made of hard wood being used for the purpose; it is then lighted, and burns steadily until consumed. I have read comfortably by its light;

the candlestick, literally a stick for the candle, consists of a bit of wood split at one end, with the fish inserted in the cleft.

These ready-made sea-candles — little dips wanting only a wick that can be added in a minute — are easily transformed by heat and pressure into liquid. When the Indian drinks instead of burning them, he gets a fuel in the shape of oil, that keeps up the combustion within him, and which is burnt and consumed in the lungs just as it was by the wick, but only gives heat. It is by no mere chance that myriads of small fish, in obedience to a wondrous instinct, annually visit the northern seas, containing within themselves all the elements necessary for supplying light, heat, and life to the poor savage, who, but for this, must perish in the bitter cold of the long dreary winter.

As soon as the Indians have stored away the full supply of food for the winter, all the fish subsequently taken are converted into oil. If we stroll down to the lodges near the beach, we shall see for ourselves how they manage it. The fish reserved for oil-making have been piled in heaps until partially decomposed; five or six fires are blazing away, and in each fire are a number of large round pebbles, to be made very hot.

By each fire are four large square boxes, made from the trunk of the pine-tree. A squaw carefully piles in each box a layer of fish about three-deep, and covers them with cold water. She then puts five or six of the hot stones upon the layers of fish, and when the steam has cleared away, carefully lays small pieces of wood over the stones; then more fish, more water, more stones, more layers of wood, and so on, until the box is filled. The oil-maker now takes all the liquid from this box, and uses it over again instead of water in filling another box, and skims the oil off as it floats on the surface.

A vast quantity of oil is thus obtained; often as much as seven hundredweight will be made by one small tribe. The refuse fish are not yet done with, more oil being extractible from them. Built against the pine-tree is a small stage, made of poles, very like a monster gridiron. The refuse of the boxes, having been sewn up in porous mats, is placed on the stage, to be rolled and pressed by the arms and chests of Indian women; and the oil thus squeezed out is collected in a box placed underneath.

Not only has Nature, ever bountiful, sent an abundance of oil to the redskin, but she actually provides ready-made bottles to store it away in.

The great seawrack, that grows to an immense size in these northern seas, and forms submarine forests, has a hollow stalk, expanded into a complete flask at the root-end. Cut into lengths of about three feet, these hollow stalks, with the bulb at the end, are collected and kept wet until required for use. As the oil is obtained, it is stored away in these natural quart-bottles, or rather larger bottles, for some of them hold three pints.

Some fifty years ago, vast shoals of eulachon used regularly to enter the Columbia; but the silent stroke of the Indian paddle has now given place to the splashing wheels of great steamers, and the Indian and the candle-fish have vanished together. From the same causes the eulachon has also disappeared from Puget's Sound, and is now seldom caught south of latitude 50° N.

CHAPTER IV.

THE ROUND-FISH, HERRINGS, AND VIVIPAROUS FISH.

THE ROUND-FISH (*Coregonus quadrilateralis*).—
Sp. Ch.: Colour, yellowish-brown, paler on the sides and belly than on the back; scales bright and glittering, each edged with a narrow border of dark-grey; cheeks, fins, and tail, a deeper tint of the same colour as that on the back; head one-sixth of the length (without the caudal); mouth very small, under-jaw shorter than the upper—no teeth perceptible.

This fish has a very wide geographical range, being found as far north (according to Sir J. Richardson) as the Mackenzie and Coppermine rivers, east of the Rocky Mountains, and latitude 49° N. the western side; how much farther they range north of 49° I had no opportunity of judging.

This handsome and delicious fish, one of the *Salmonidæ*, is most valuable as an article of food to the Indians, west of the Rocky Mountains,

the White-fish (*Coregonus albus*), or 'Attihawmeg' (which means 'reindeer of the sea'), being of like importance to those residing east of the mountains. There the Indians frequently have to subsist entirely on white-fish, and, at many of the fur-trading stations, the traders get very little else to eat during nine months of the twelve.

'In one small lake (Lake St. Ann's), near Fort Edmonton, forty thousand white-fish were taken, of an average weight of three to four pounds, in the course of three weeks.' (*Palliser's Exp.*)

Two modes are adopted for preserving them—one that of sun-drying, the other by freezing, in which state they may be kept perfectly sweet and free from taint for the whole winter.

The Round-fish is seldom taken over two pounds in weight, and prior to spawning they are loaded with fat, which on the shoulders almost amounts to a hump, but becomes thin, watery, and insipid, after the all-important duty of providing for their offspring is accomplished. I am not quite sure when they return to the sea, as nothing is seen of them after the ice sets in, towards the end of November, until their arrival on the following year. The ova are deposited in much the same way as that of other *Salmonidæ*:

a hollow made in the gravel contains the eggs and milt, which are covered over and abandoned—the young fish, on its emergence from the egg, taking care of itself as best it can.

One may journey a long way to witness a prettier or more picturesque sight than Round-fish harvesting on the Sumass prairie: the prairie bright and lovely; the grass fresh, green, and waving lazily; various wild flowers, peeping coyly out from their cosy hiding-places, seem making the most of the summer; a fresh, joyous hilarity everywhere, pervading even the Indians, whose lodges in great numbers lie scattered about. From the edges of the pine-forest, where the little streams came out from the dark shadow into the sunshine, up to the lake, the prairie was like a fair. Indians, old and young; chiefs, braves, squaws, children, and slaves; were alike busy in capturing the round-fish, that were swarming up the streams in thousands: so thick were they that baits and traps were thrown aside, and hands, baskets, little nets, and wooden bowls did the work; it was only requisite to stand in the stream and bale out the fish. Thousands were drying, thousands had been eaten, and as many more were wasting and decomposing on the bank. Supposing every fish escaping the Indians,

otters, and the various enemies that it meets with in ascending the rivers, succeeded in depositing its ova, where or how they find room to spawn, or what becomes of the offspring, is more than I know.

Round-fish are cured by splitting and sun-drying, precisely in the same manner as salmon. I have had very good sport angling for round-fish, by using a rough gaudy fly. They rise readily, and struggle obstinately, when hooked, but soon give up; turning on their side, they permit themselves to be dragged upon the bank without attempting a flap of resistance.

Some of these fish remain permanently, or at any rate for some time, in fresh-water. I have often taken them in the Na-hoil-a-pit-ka river, to get into which they must have leaped the Kettle Falls during a high flood, being quite 800 miles from the sea; and as they are caught in the spring, I think it fair to conclude they do not invariably return to the sea after spawning.

HERRINGS.—The Vancouver Island Herring (*Malletta cœrulica*, Grd.).—*Sp. Ch.*: Head, about one-fifth of the total length of the body, slender, its shape in profile somewhat fusiform; back, bright steel-blue colour, shading away on the sides to brilliant silvery-white: fins, yellow-white,

but uniform in colour; posterior extremity of maxillary bone extending to a vertical line drawn through the middle of the orbit; eye, subcircular, large; colour, copper-red in the freshly-caught fish; anterior margin of the dorsal fin, nearer the extremity of the snout than the insertion of the caudal. The average length is somewhat about ten inches. Indian name along the coast, *Stole*; Skadget Indian, *Lo-see*.

There are three distinct herring arrivals, one beginning in February and March; these fish are small, and somewhat lean. About the beginning of April the run commences; these are finer, full of spawn, and in high condition: in June and July, and extending through the summer, small shoals occasionally make their appearance, but never as fine as the April fish.

Toward the middle of April herring legions commence arriving from seaward in real earnest; brigade follows brigade in rapid succession, until every bay, harbour, inlet, estuary, and lagoon is literally alive with them. Close in their rear, as camp-followers hang on the skirts of an army, come shoals of dogfish, salmon, and fish-eating sea-birds.

I have often seen a shoal of herrings, when hotly pursued by the dogfish, dash into a little

rock-bound nook, the water lashed into white spray by a thousand tails and fins, plied with all the power and energy the poor struggling fish could exert to escape the dreaded foe. A wall of rocks, right and left, ahead the shelving shingle—on they go, and hundreds lie high-and-dry, panting on the pebbles. It is just as well perhaps to die there, as to be torn, bitten, and eaten by the piratical cannibals that are waging fearful havoc on the imprisoned shoal. The dogfish wound ten times as many as they eat, and, having satiated and gorged their greedy stomachs, swim lazily away, leaving the dead, dying, and disabled to the tender mercies of the sea-birds watching the battle, ever ready to pounce upon the unprotected, and end its miseries.

Garnering the herring-crop is the Coast Indian's best 'sea-harvest;' lodges spring up like mushrooms along the edges of the bays and harbours; large fleets of canoes dot the water in every direction, their swarthy crews continually loading them with glittering fish; paddling ashore, they hand the cargo to the female part of the community, and then start again for a similar freight.

Indians have various plans for catching herrings. Immense numbers are taken with small hand-nets, literally dipping them out of the water into

the canoes; they also employ the 'rake,' already described as used for taking candle-fish. One savage, sitting in the stern of his canoe, paddles along, keeping in the herring shoal; another, having the rounded part of the rake firmly fixed in both hands, sweeps it through the crowded fish, from before aft, using all his force: generally speaking, every tooth has a herring impaled on it, sometimes three or four. It is astonishing how rapidly an Indian will fill his canoe with herrings, using this rude and primitive contrivance.

A wholesale system of capture is practised in Puget's Sound, Point Discovery, and Port Townsend, where large mud-flats run out for long distances into the sea, which are left quite dry at low-tide. Across these flats Indians make long dams of latticework, having here and there openings like our salmon-traps, allowing herrings to pass easily in, but preventing their return. Shoal after shoal pass through these 'gates,' but are destined never to get back to their briny home. It is not at all uncommon to take from two to three tons of fish at one tide, by this simple but ingenious method.

When the tide is well out, and the flats clear of water, the Indians bring down immense quan-

tities of fir-branches, and stick them in the mud, lay them on the ground, and, in all sorts of ways, distribute them over the flats, within the weir-dam. On these branches the herring-spawn gets entangled; when covered with spawn the branches are carried to the lodges, and the fish-eggs dried in the sun. Thus dried, and brushed into baskets, it is in appearance very much like coarse brown sand; it is then stored away, and when eaten mixed with fish-oil is esteemed by the Indians as the very perfection of feeding. This spawn is to Indians what *caviare* is to Russians; but as I do not like either, it may be I am not an authority on its merits as a table dainty.

All herrings taken in the weirs are not eaten; the Indians dry or otherwise preserve them, but the great use to which they appropriate them is to extract the oil. This is a grand process, and carried on entirely by squaws. It would be a great blessing, and save much annoyance, if you could only leave your nose at home, or at some distance away, during your visit to an Indian village in herring-time, or whilst oil-making. The entire atmosphere appears saturated with the odour of decomposing fish, rancid oil, Indians, and dogs—a perfume the potency

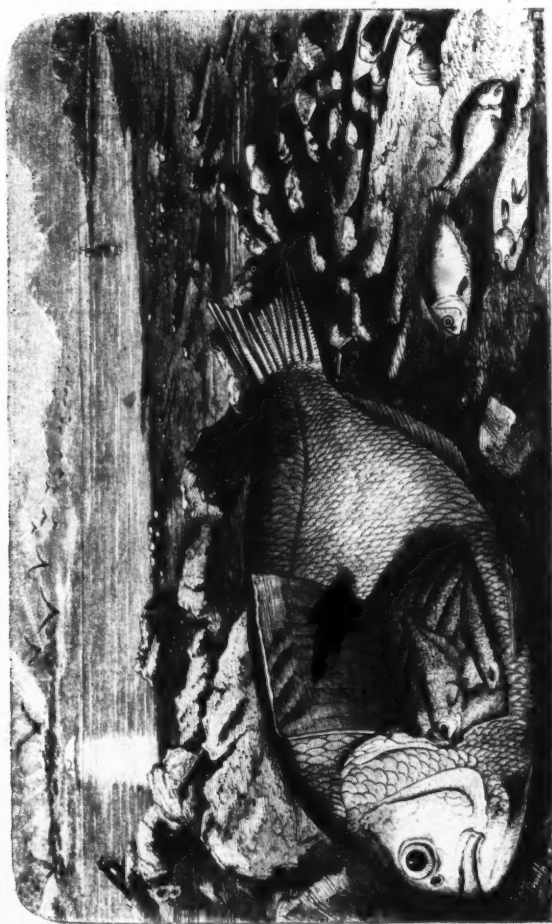
of which you only realise by having a thorough good sniff. Then, if you ever forget it, or wish to indulge your olfactory organ again, your tastes and mine, gentle reader, must widely differ. The oil is extracted and stored away (as described in a previous chapter) in native bottles.

I have no hesitation in stating my conviction that herring-fisheries established east and west of Vancouver Island, or at different points along the mainland coast, in the Straits of Juan de Fuca, or amidst the islands in the Gulf of Georgia, would turn out most remunerative speculations. It is true that herring-fishing has been tried, but only on the most limited scale. To make it pay; for that, after all, is the primary consideration; capital must be employed, and skilled hands to manage the drying, curing, and packing. Salt can be obtained in any quantities; wood in abundance, to make casks, build houses, boats, or ships; herrings within *millions*, requiring neither risk nor skill to catch. The rapidly-growing colonies of Vancouver Island and British Columbia offer ready markets for home consumption; China, Japan, the Sandwich Islands, and the entire coast southward from San Francisco to Mexico, afford facilities for disposing of almost any quantity of preserved fish. Those who un-

dertake herring-fishing in North-western waters on a large scale, judiciously applying capital, skilled labour, and good management, will reap an ample harvest, and become the real 'Herring Kings' of the far North-west.

VIVIPAROUS FISH.—We are so accustomed to associate the production of young fishes with eggs and milt, familiar to all as hard and soft roe in the cured herring, that it is difficult to believe in the existence of a fish bringing forth live young, just as do dogs, cats, rats, and mice—only with this difference, that, in the case of the fish, the young are perfect in every detail, when launched into the water, as the parent, and swim away self-dependent, to feed or be fed on, as good or ill-luck befalls the little wanderer. The woodcut represents the female fish with the young *in situ*, together with others scattered round her, having fallen out when the walls of the abdomen were dissected open: the drawing was made from a female fish I brought from Vancouver Island, and now exhibiting in the Fish Room of the British Museum.

At San Francisco, as early as April, I saw large numbers of viviparous fish in the market for sale; but then, it is an open question whether these fish really arrive at an earlier period of



THE VIVIPAROUS-FISH AND ITS YOUNG.

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the year in the Bay of San Francisco than at Vancouver Island. I think not. That they are taken earlier in the year is simply due to the fact, that the fishermen at San Francisco have better nets and fish in deeper water, than the Indians, and consequently take the fish earlier. The habit of the fish is clearly to come into shallow water when the period arrives for producing its live young; and from the fact that some of these fish are occasionally taken at all periods of the year, I am induced to believe that they do not in reality migrate, but only retire into deeper water along the coast, there to remain during the winter months, reappearing in the shallow bays and estuaries in June and July, or perhaps earlier, for reproductive purposes; here they remain until September, and then entirely disappear.

They swim close to the surface in immense shoals, and numbers are very craftily taken by the Indians, who literally frighten the fish into their canoes. At low-tide, when a shoal of fish is in the bay, or up one of those large inlets that intersect the coast-line, the savages get the fish between the bank (or the rocks, as it may be) and the canoe, and then paddle with all their might and main among the terror-stricken

fish, lashing the sea with their paddles, and uttering the most fiendish yells. Out leap the fish from the water, in their panic to escape this (to their affrighted senses) terrible monster; and if not 'out of the fryingpan into the fire,' it is out of the sea into the canoes—which in the long run I take to be pretty much the same thing.

It appears to be a singular trait in the character of viviparous fish, that of leaping high out of the water on the slightest alarm. I have often seen them jump into my boat when rowing through a shoal, which is certainly most accommodating. The Indians also spear them: they use a long slender haft with four barbed points, arranged in a circle, but bent so as to make them stand at a considerable distance from each other. With this spear they strike into a shoal of fish, and generally impale three or four; many are caught with hooks, but they bite shily, the only baits I have seen taken being salmon-roe nearly putrid, or bits of crab.

Just prior to my leaving Vancouver Island, numbers were netted by some Italian fishermen who had a seine. They found a ready sale for them in the market, but as a table-dainty they are scarcely worth eating; the flesh is insipid, watery, and flabby, and I am convinced that no

system of cooking or culinary skill would ever convert it into a palatable fish.

The geographical range of viviparous fish, as far as I have any opportunity of judging, is from the Bay of San Francisco to Sitka. It may perhaps (and I have but little doubt that it does) extend much farther south along the Mexican coast; but this I can only surmise, never having seen them beyond the limits above stated. It frequents all the bays and harbours on the east and west sides of Vancouver Island, and is equally abundant in the Gulf of Georgia and the Straits of Juan de Fuca; making its appearance about the same period, or perhaps somewhat earlier, in the various inlets on the Oregon coast, from Cape Flattery to the Bay of San Francisco. It will be just as well perhaps, before I go into the subject of its specific characters and singular reproductive organs, I should mention how I first stumbled upon the fact of its being viviparous.

Soon after I arrived at Vancouver Island, I at once set to work to investigate, as far as it lay in my power, the habits and periods of migration of the different species of fish periodically visiting the North-west coast. The sole means then at my disposal to obtain fish for examination, or as specimens to send home, was to employ Indians

or catch them myself; so it happened, some of these fish were first brought me by Indians. Cutting one down the side (the plan I usually adopt to skin a fish, keeping the opposite side untouched), to my intense surprise, out tumbled a lot of little fish! My wildest dreams had never led me to suppose a fish I then thought was a bream, or one of the perch family, could be viviparous. I at once most hastily arrived at the conclusion that the greedy gourmand had eaten them. Dropping my knife, I sat in a most bewildered state looking at the fish.

The first ray of light that shone in to illumine my mystification seemed to spring from the fact, that each little fish was the model, counterpart, and facsimile of the larger, and in shape, size, and colour were exactly alike: from the position too they occupied in the abdomen of the larger fish, I was led at once to see the error of my first assumption, that they had been swallowed. Carefully dissecting back the walls of the abdomen, I discovered a delicate membranous bag or sac having an attachment to the upper or dorsal region, and doubled upon itself into numerous folds or plaits, and between each of these folds was neatly packed away a little fish; the bag was of a bluish-white colour, and contained fourteen

fish. I had no longer any doubt that the fish was viviparous, and that it was a true and normal case of ovarian gestation. So much for my first discovery; the details of my subsequent examinations I shall again have occasion to refer to.

It happened most curiously that a Mr. Jackson (I believe a government officer of the United States) was, about this same period, amusing himself by fishing at Salsalita, and caught two viviparous fish, a male and a female. On cutting open the female, to obtain a piece of the belly for bait, he, like myself, was astonished at seeing a whole bevy of tiny fish come scrambling out, and at first imagined, as I did, that they had been swallowed. He immediately wrote a letter to Professor Agassiz, sending the mutilated fish, having previously satisfied himself that they had not been devoured, and stating at length his singular discovery. The professor was astonished, and disbelieved the possibility of the fish being viviparous, imagining some error had crept into the statement sent him by Mr. Jackson; but other fish in a similar state were subsequently obtained by Mr. Carey, and forwarded to the learned professor. The fact was then most undeniably established, that this and many other species were strictly viviparous.

I have spoken of this at some length, because it is a curious coincidence that the same fact should have been discovered by two men a long distance apart, about the same date, and by both in the same way,—by sheer accident.

Now we come to a ticklish question: how are the young fish vitalised in the abdomen of the mother? In this case I shall adopt what I conceive to be the most straightforward course, which is candidly to give my own thoughts, and solicit from abler, older, and better physiologists their opinions or theories—for I sincerely think this is a question well worth careful investigation. I believe the ova, after impregnation, at first goes through the same transformations in the ovary as it would do, supposing it to have been spawned and fecundated in the ordinary spawning-bed, but only up to a certain point; then, I think, the membrane enfolding the ova, that have by this time assumed a fishlike type, takes on the character and functions of a placental membrane, and the young fish are supplied by an umbilical cord, just as in the case of a foetal mammal. But a third change takes place. There can be no doubt that the young fish I cut out, and that swam away, had breathed before they were freed from the mother; hence I am led

to think that, a short time prior to the birth of the young, sea-water has access to this marsupial sac, washes over the infant fish, the gills assume their normal action, and the regular systemic circle is established. Maturity attained, the umbilical attachment snaps, and the little fish, perfect in every detail of its organisation, is launched into the deep, to brave its many perils, and shift for itself. The strong transverse muscles attached to the powerful sphincter (constituting the genital opening acting from the abdominal walls), I imagine, are in some way concerned in admitting the sea-water, and it appears to me a contrivance admirably adapted to effect such a purpose; but how impregnation takes place, I may at once honestly confess—I do not know.

The male is much like the female, but more slim, and the milt just like that of other fish. I can only conjecture that fecundation is accomplished through the medium of the sea-water, admitted by the curiously-contrived floodgate of the female, carrying in the milt-germs, and washing them over the ova.

The actual period of utero-gestation I am by no means sure about, but I am inclined to think

they breed twice in the year. It is worthy of remark that the young mature fish are very large, when compared with the size of the mother. In a female fish eleven inches in length, the young were three inches long--the adult fish four-and-a-half inches high, the young an inch.

The only instance I can find recorded of a viviparous fish bearing any analogy to the *Embiotocidæ* is the viviparous blenny (*Zoarces viviparus*, Cuv.). Of course I exclude the sharks and rays. Of the viviparous blenny little or nothing appears to me to be known. On reference to Pennant's 'British Zoology,' all he says is, that it was discovered by Schonevelde, and that Sir Robert Sibbald afterwards found it on the Scotch coast, and it was mentioned by Linnaeus in his account of the Swedish Museum.

I quote the following paragraph verbatim from Pennant's 'British Zoology.' Speaking of the blenny, he goes on to say: 'It is viviparous, bringing forth two or three hundred young at a time. Its season of parturition is a little after the depth of winter; before midsummer it quits the bays and shores, and retires into the deep, where it is commonly taken. It comes into the mouth of the River Esk at Whitby, Yorkshire, where it is frequently taken from off the bridge.'

In Cuvier's 'Animal Kingdom' (vol. i. 'Fish'), all I can glean is that the blenny is viviparous. Yarrel, in his 'British Fishes,' speaks of a Mr. Low, who put a number of the small fishes (the young of the blenny) in a tumbler of sea-water, in which they increased in size, but eventually died from the want of fresh-water. Again, he quotes a Mr. Neil, who saw in the Edinburgh market, in 1807, several dozens of young fish escape alive from the female. 'The arrangement of the perfectly-formed young in the fœtal sac of the gravid female is very remarkable.'

It is quite clear from the above quotations that there is an analogy, if not a close one, between the reproductive organs of the blenny and those of the viviparous fish from the North-west seas; for 'the fœtal sac of the gravid female' evidently means that there is a kind of placental sac, in which the young are contained; but it leaves us quite as much in the dark as ever as to how fœtal life is supported. As the ova deposited in the usual way (when fecundated) contains all that is requisite for the development of the embryo, it is just possible that the same process goes on in the womb of the female viviparous fish, and that the fœtal sac is only a wrapper, formed by the

widened end of the ovary. But still I maintain that it fulfils a far more important duty.

I fear I have been rather prolix in the foregoing descriptions, but I must plead the novelty and importance of the subject as my excuse. The most beautiful of all the species of these fish is the sapphire perch (so called by the traders), very plentiful in Puget's Sound. Eighteen exquisitely beautiful mazarine-blue lines or stripes mark its entire length from head to tail; and above and below this line are a number of spots of most dazzling blue, arranged in a crescent shape, about the eyes and gill-covers. Between these spots the colour changes, as it does in the dolphin, throwing off a kind of phosphorescent light of varying shades of gold, purple, and green—the back bright-blue, but darker than the stripes; the belly white, marked by golden-yellow streaks.

But now for the most important feature in the history of these fish—that of bringing into the world their young alive, self-dependent, and self-supporting, as perfect in their minutest organisation as the parent-fish that gives them birth. The generative apparatus of the female fish when in a gravid state may be defined as a large bag or sac. Ramifying over its surface may be seen

a most complicated and strangely beautiful vascular arrangement—a network of vessels, the use of which is clearly to convey the lifegiving fluid to the infant fish, and carry it back again, after having served its destined purpose, to be revived for future use. The way this sac is, as it were, folded, and the different compartments made for the accommodation of the embryonic fish, is most singular, and very difficult to describe clearly.

The best illustration I can think of is an orange. You must imagine the orange divided into its regular number of little wedge-shaped pieces, and each piece to represent a fish; that the rind of the orange is a delicate membrane, having a globular shape, and easily compressed or folded. You now desire to fit the pieces together again in the original orange-shape, but you must begin on the *outside* of the globular membrane, pressing in with each section a fold of membrane (remember that each represents a fish); when each piece is in its place, you will still have the sac in its rounded form, but the rind or membrane has been folded in with the different pieces. If I have made myself understood, it will be seen that there must be a double fold of membrane between

each portion of orange. This is exactly the way the fish are packed in this novel placental sac. If it were practicable to remove each fish from its space, and the sac retain its normal shape, there would be twelve or fourteen openings (depending upon the number of young fish), the wall of each division being a double fold of membrane—the double edges wrapping or, as it were, folding over the fish. Now make a hole in the end of this folded bag, and blow it full of air, and you get at once the globe-shaped membranous sac I have likened to an orange.

The fish are always arranged to economise space: when the head of a young fish points to the head of its mother, the next to it is reversed, and looks towards the tail. I am quite convinced that the young fish are packed away by doubling or folding the sac in the way I have endeavoured to describe. I have again and again dissected out this ovarian bag, filled with fish in various stages of development, and floating it in salt-water, have, with a fine-pointed needle, opened the edges of the double membranous divisions that enwrap the fish—(the amount of overlapping is of course greater when the fish is in its earlier stages of development). On separating the edges of the sac, out the little fishes pop. I have obtained them in all stages of their growth,

—but sometimes (and this not once or twice, but often) have set free the young fish from its dead mother. Thus prematurely cut loose from its membranous prison, the infant captive, revelling in its newly-acquired liberty, swam about in the saltwater, active, brisk, and jolly, in every particular, as well able to take care and provide for itself as its parent. The female external genital opening is situated a little posterior to the anal opening; the orifice is at the apex, and in the centre of a fleshy conical protuberance, which is in fact, a powerful sphincter muscle, *moored*, as it were, in its place by two strong muscular ropes, acting from and attached to the walls of the abdomen.

Dr. Günther, in the British Museum Catalogue of Fishes, uses the generic title of *Ditrema*, which I have adopted. The first glance at the fish, as it lies on the table or on the beach, would lead you to pronounce it a *Pomotis* (belonging to the family *Percidae*): the northern *Pomotis* (*P. vulgaris*) is a good example, and very common along the shores of Lake Huron, where I have often caught them. Or, on the other hand, you would be perhaps tempted to call it a *Sparus*; the gilthead (*S. auratus*) may be taken as a type suggesting the resemblance. This fish is taken in large numbers in the

Mediterranean, and occasionally on the French and Spanish coasts. But a close investigation into the more marked generic and specific characters, apart from their reproducing organs, at once clearly shows they belong neither to the one family nor the other; they differ much more from the percoids than from the sparoids, but the cycloid scales remove them at once from the sparoids, in which the scales present a very uniform ctenoid type.

The illustration represents a female *Ditrema argenteum*, Brit. Mus. Cat., 'Fishes.'

Amphistichus argenteus, Agass., Am. Journ., 1854; Soc. Nat. Hist., 1861, p. 131; Pacif. R. R. Exp., 'Fishes,' p. 201.

Mytilophagus fasciatus (Gibbons).

Amphistichus similes (Grd.).

The middle dorsal spines are either nearly as long as, or somewhat longer, than the posterior; scales on the cheek, in five series, somewhat irregularly disposed. The height of the body is rather more than a fourth of the total length (without caudal); jaws equal anteriorly; the maxillary extends to below the centre of the orbit; lips thin, the fold of the lower interrupted in the middle. For description of species, *vide* Appendix, vol. ii.

CHAPTER V.

STICKLEBACKS AND THEIR NESTS—THE BULLHEAD—THE ROCK-
COD—THE CHIRUS—FLATFISH.

THE genus *Cottoideæ* (fish having mailed cheeks) has a great many representatives, common on Vancouver Island and the British Columbian coasts. The least of the family, the stickleback, is so singularly different from most other fishes in its habits, as to merit the first consideration.

In the months of July and August it would be difficult to find a stream, large or small, swift or slow, lake, pool, or muddy estuary, east and west of the Cascade Mountains, that has not in it immense shoals of that most irritable and pugnacious little fish the stickleback, ever ready on the slightest provocation to engage in a battle. Let friend or foe but rub against his royal person, or come nearer his private subaqueous garden than he deems consistent with safety or good behaviour, in a moment the spines are erected like spear-points, the tiny

eyes glow with fury, the colours decking his scaly armour intensify, and flash with a kind of phosphorescent brightness, until the diminutive gladiator looks the impersonation of rage and fury; but as we cultivate his acquaintance, and gain a better knowledge of his real character, we shall discover that his quarrelsome disposition is not so much attributable to a morose temper, and a love of fighting for fighting's sake, as to a higher and more praiseworthy principle.

No amount of thinking would lead one to imagine that his pugnacity arises from intense parental affection: a love of offspring, scarcely having a parallel in the living world, prompting him to risk his life, and spend a great deal of his time in constantly-recurring paroxysms of fury and sanguinary conflicts, in which it often happens that one or more of the combatants gets ripped open or mortally stabbed with the formidable spines arming the back. Skill in stickleback battles appears to consist in rapidly diving under an adversary, then as suddenly rising, and driving the spines into his sides and stomach. The little furies swim round and round, their noses tightly jammed together; but the moment one gets his nose the least bit under that of his foe, then he plies his fins with all his might, and forcing

himself beneath, does his best to drive in his spear, if the other be not quick enough to dart upwards and escape the thrust; thus squaring they fight round after round until the death or flight of one ends the combat.

I have often, when tired, lain down on the bank of a stream, beneath the friendly shade of some leafy tree, and gazing into its depths watched the sticklebacks either guarding their nests already built, or busy in their construction. The site is generally amongst the stems of aquatic plants, where the water always flows, but not too swiftly. He first begins by carrying small bits of green material, which he nips off the stalks, and tugs from out the bottom and sides of the banks; these he attaches by some glutinous material, that he clearly has the power of secreting, to the different stems destined as pillars for his building. During this operation he swims against the work already done, splashes about, and seems to test its durability and strength; rubs himself against the tiny kind of platform, scrapes the slimy mucus from his sides, to mix with and act as mortar for his vegetable bricks. Then he thrusts his nose into the sand at the bottom, and bringing a mouthful scatters it over the foundation; this is repeated until enough has

been thrown on to weight the slender fabric down, and give it substance and stability. Then more twists, turns, and splashings, to test the firm adherence of all the materials that are intended to constitute the foundation of the house, that has yet to be erected on it. The nest or nursery, when completed, is a hollow, somewhat rounded, barrel-shaped structure, worked together much in the same way as the platform fastened to the water-plants; the whole firmly glued together by the viscous secretion scraped from off the body. The inside is made as smooth as possible, by a kind of plastering system; the little architect continually goes in, then turning round and round, works the mucus from his body on to the inner sides of the nest, where it hardens like a tough varnish. There are two apertures, smooth and symmetrical as the hole leading into a wren's nest, and not unlike it.

All this laborious work is done entirely by the male fish, and when completed he goes a-wooing. Watch him as he swims towards a group of the fair sex, enjoying themselves amidst the water-plants, arrayed in his best and brightest livery, all smiles and amiability: steadily, and in the most approved style of stickleback love-making, this young and wealthy bachelor

approaches the object of his affections, most likely tells her all about his house and its comforts, hints delicately at his readiness and ability to defend her children against every enemy, vows unfailing fidelity, and, in lover-fashion, promises as much in a few minutes as would take a lifetime to fulfil. Of course she listens to his suit: personal beauty, indomitable courage, backed by the substantial recommendations of a house ready-built, and fitted for immediate occupation, are gifts not to be lightly regarded.

Throwing herself on her side, the captive lady shows her appreciation, and by sundry queer contortions declares herself his true and devoted spouse. Then the twain return to the nest, into which the female at once betakes herself, and therein deposits her eggs, emerging when the operation is completed by the opposite hole. During the time she is in the nest (about six minutes) the male swims round and round, butts and rubs his nose against it, and altogether appears to be in a state of defiant excitement. On the female leaving he immediately enters, deposits the milt on the eggs, taking his departure through the backdoor. So far, his conduct is strictly proper, but, I am afraid, morality in stickleback society is of rather a

lax order. No sooner has this lady, his first love, taken her departure, than he at once seeks another, introduces her as he did the first, and so on wife after wife, until the nest is filled with eggs, layer upon layer—milt being carefully deposited betwixt each stratum of ova. As it is necessary there should be two holes, by which ingress and egress can be readily accomplished, so it is equally essential in another point of view. To fertilise fish-eggs, running water is the first necessity; and as the holes are invariably placed in the direction of the current, a steady stream of water is thus directed over them.

For six weeks (and sometimes a few days more) the papa keeps untiring sentry over his treasure, and a hard time he has of it too: enemies of all sorts, even the females of his own species, having a weakness for new-laid eggs, hover round his brimming nest, and battles are of hourly occurrence; for he defies them all, even to predatory water-beetles, that, despite their horny armour, often get a fatal lance-wound from the furious fish. Then he has to turn the eggs, and expose the under ones to the running water: and even when the progeny make their appearance, his domestic duties are far from ended, for it is said

(although I have never seen him do it), 'When one of the young fish shows any disposition to wander from the nest, he darts after it, seizes it in his mouth, and brings it back again.'

There are three species that come into the fresh-waters of British Columbia, to nest and to hatch their young:—

Gasterosteus serratus, the Saw-finned Stickleback (Ayres, Proc. Cal. Acad. Nat. Sc. 1855 p. 47).—*Sp. Ch.*: Body entirely plated; peduncle of tail keeled; the three dorsal spines conspicuously serrated on their edges; anterior fin a little in advance of the base of the pectoral; insertion of ventrals in advance of the second dorsal spine—their own spines serrated on both edges; posterior margin of caudal somewhat hollowed. The colour of the freshly-caught fish is greyish-olive along the dorsal line; but on the sides, particularly in the male, it shades away into an iridescence, like that seen on mother-o'-pearl, again changing to pure silvery-white on the abdomen.

Gasterosteus Pugettii, the Puget Sound Stickleback (Grd., Proc. Acad., Nat. Sc. Phil., viii. 1856).—*Sp. Ch.*: Body only in part plated, peduncle of tail not keeled; the three dorsal spines without serrations; the anterior one inserted

immediately behind the base of the pectorals; ventrals inserted anterior to the second dorsal spine. The colour is very much like that of *G. serratus*, but more decidedly purplish on the sides; the eyes bright red in both species, when fresh from the water.

Gasterosteus concinnus, the Tiny Stickleback (Rich., F. B. A., p. 57, vol. iii.).—*Sp. Ch.*: Head one-fourth of the total length, mouth small, and teeth but feebly developed; dorsal spines nine, seventh and eighth smaller than the preceding ones, the ninth longer than any of the others. The abdomen is protected by a bony cuirass, and the ventrals represented by two spines. All the spines are moveable, and destitute of serrations. Colour of the back a bright sea-green, sides purplish-pink, shading away to a silvery-white on the belly; the entire body speckled with minute black spots.

This handsome little stickleback, though smaller in size than his brethren, is vastly more abundant. Sir J. Richardson speaks of it 'as being common in the Saskatchewan, ranging as far north as the 65th parallel.' So abundant are they in the lakes and pools about Cumberland House, east of the Rocky Mountains, that sledge-loads are dipped out with wooden bowls, and

used for feeding the dogs. I have seen cartloads of these tiny fish in a single pool, left by the receding waters after the summer floods, on the Sumass prairie and banks of the Chilukweyuk river. As the water rapidly evaporated, the miserable captives huddled closer and closer together, starving with hunger and panting for air, but without the remotest chance of escape. The sticklebacks die and decompose, or yield banquets to the bears, weasels, birds, and beetles; the pool dries, and in a few weeks not a trace or record remains of the dead host of fishes. In the smaller streams, a bowl dipped into the water where the sticklebacks were thickest, could be readily filled with fish.

Sticklebacks are the most voracious little gourmands imaginable, devourers of everything, and cannibals into the bargain; tearing their wounded comrades into fragments, they greedily swallow them. I have often taken this species (*G. concinnus*) in Esquimalt Harbour, where they are very plentiful during the winter months. The natives of Kamtschatka make use of a stickleback (*G. obolarius*), which they obtain in great quantities, not only as food for the sledgedogs, but for themselves also, by making them into a kind of soup. West of the Rocky

Mountains I have never seen the Indians use them as an article of diet, not from any dislike to the fish, but simply because there are larger and better fishes quite as abundant, and as easily procurable. Whether there are any species in the North-west, strictly marine, building their nests in the sea and never entering fresh-water, I am unable to say.

The Fifteen-spine Stickleback (*Gasterosteus spinachia*) is along our own coasts strictly a tenant of the ocean, and makes a nest of seaweeds glued together with an adhesive mucus, in the same way as the nests of our little friends are cemented, that seek as their nursery the clear cold streams of British Columbia, Oregon, and Vancouver Island.

THE BULLHEAD.—The stickleback has a near relative, with a name nearly as ugly as the owner, '*Bullhead*' being certainly not suggestive of beauty! With such a name, we are the less disappointed to find the entire family of our friends ill-favoured, prickly, hard-skinned, and as uncomfortable to handle as to look at. Plates of scaly armour cover the head, from which sprout sharp spines, like a crop of horns; between these are tubercles that have the appearance of being rivets. The body looks like an appendage,

tapering away to a mere nothing at the tail. There are many species frequenting the lakes and rivers of British Columbia, during the summer months, for the purpose of spawning. On their return to the sea, swarms of young bullheads, of various species, regularly follow the ebb and flow of the tide; and in rough weather every breaker, as it rushes up the shelving shingle, carries a freight of tiny fish, that are left struggling amid the pebbles in thousands, to be dragged back and floated out again by the succeeding wave, or to find a last home in the stomachs of the sea-birds.

The bullhead does not actually build a nest, like the stickleback, but makes an egg-house, on the bottom of some slowly-running stream. The male usually selects a hollow under a boulder, or a space betwixt two stones, and shoves out the lesser pebbles and gravel, to form a pit. This accomplished, several females are in turn induced to deposit their roe, having done which they are driven off by the male, who supplies the milt, then shovels the sand and pebbles, with his huge horny head, over the treasure, until it is completely covered: more females, more eggs and milt, more shovelling, until the affair is completed to the bullhead papa's satisfaction. Now stand clear all thievish prowlers! Let any-

thing of reasonable size venture near—then head down, and plying all his propellers to their utmost power, he charges at them, driving his horns in to the very hilt; free again, seizes hold with his mouth—thus biting and stabbing, until he kills or routs his foe. I am not able to say exactly how long the eggs are incubating, but, as nearly as I could observe them (in the Sumass and Chilukweyuk streams), in about eight weeks the young escape from the egg-house. The females were invariably driven away, with the same ferocity as other unwelcome guests, from the depositing the spawn to the exit of the infant fish: then old and young disappear into deeper water, and are seldom seen again.

During the winter, I constantly obtained the bullheads from out the seine-nets used in Esquimalt Harbour to procure fish for the supply of Victoria market. Rejected by the fishermen, the Indians greedily gathered up the despised fishes, broiled them over the lodge-fire, empaled on a slender twig, then feasted right-royally on the grilled remains of the spiny martyrs.

The genus *Centridermichthys* is characterised as follows:—Head more or less depressed, rounded anteriorly; head and body covered

with soft and scaleless skin, more or less studded with prickles or granulations; teeth in the jaws, on the vomer and palatine bones.

Centridermichthys asper (*Coltus asper*, Rich. F. B. A. 'Fishes,' p. 295), the Prickly-skinned Bullhead. — *Sp. Ch.*: Gill-openings separated beneath, by an isthmus; three opercular spines; crown with very small warts, back of the body with very minute spines; colour light yellowish brown, thickly dotted with spots nearly black. The length of the adult fish is seldom over three-and-a-half inches.

These tiny bullheads are common in all the streams east and west of the Cascades. They are not fond of going very far from the sea, but leave the larger rivers soon after entering them, seeking the clear rivulets and shallow lakes. In the streams flowing through the Sumass and Chilukweyuk prairies, in those flowing into Puget's Sound, and north of it on the mainland to Fort Simpson, and in all the streams draining Vancouver Island, the prickly-skinned bullhead can be easily found in July and August. Similar in habits, and frequenting the same localities as the preceding, are several species described in the Appendix.

THE ROCK COD.—Belonging to the same family

is the rock cod, as it is usually styled by the fishermen who provide the Victoria and San Francisco markets; one of the best and daintiest table-fish caught in the seas round Vancouver Island. It often attains a considerable size, and being in tolerable abundance, constitutes an article of some commercial value.

As numbers are taken all through the year, and as I never saw them in fresh-water, it is fair to assume they are strictly marine. Their appearance is not prepossessing, giving one the idea of being all head, fins, and bones, as they lie gasping on the shingle; an error of the eye only, as you discover when testing the substance and quality of a large one, smoking hot from the fish-kettle. Three species are commonly offered for sale in the markets, one of which is also taken in Japanese seas. They vary in size; I have often seen a rock cod thirty inches in length. Biting greedily at any bait, they are constantly caught by the Indians when trolling for salmon.

The one usually seen in the Victoria markets is *Sebastes inermis* (Cuv. and Val., p. 346; Faun. Japon., 'Poiss.', p. 47, pl. 21, figs. 3, 4), the Weak-spined Rock Cod.—*Sp. Ch.*: The height of the body equals the length of the head; the upper surface of the head flat, with some depressed

spines behind the orbit. The fourth and fifth dorsal spines are the largest, longer than those of the anal, and nearly half the length of the head. Colour, uniform brownish.

THE CHIRUS.—On the fish-stalls in Victoria and San Francisco markets the visitor may generally see, lying by the side of the dingy, spiny rock cod, a handsome, shapely fish, about eighteen inches in length. Its sides, though somewhat rough, rival in beauty many a tropical flower: clad in scales, adorned with colours not only conspicuous for their brilliancy, but grouped and blended in a manner one sees only represented in the plumage of a bird, the wing of a butterfly, or the petals of an orchid, this 'ocean swell' is known to the ichthyologist as the Chirus—the *Terpugh* (a file) of the Russians—the *Idyajuk* of the Aleutian Islanders—the *Tath-le-gest* of the Vancouver Islanders.

Quite as delicious to the palate as pleasant to the eye, the chirus is altogether a most estimable fish. Its habit is to frequent rocky places, particularly where long ledges of rocks are left bare at low-water, and sheltered at the same time from the surge of the sea in rough weather. Here the chirus loves to disport his gaily-dressed person, amidst the gardens of sea

plants: for in these gardens dwell jellyfish, tender little crustaceans, soft-bodied chitons, crisp shrimps, and juicy annalides—all dainty viands, on which this gay loungeer delights to regale himself.

At low-tide, when strolling over the slippery rocks that everywhere gird the eastern side of Vancouver Island, in the larger rock-pools I was certain to see lots of these fish imprisoned, having lingered imprudently at their feasts. This indulgence constantly costs the idler his life: gulls, herons, shags also prowl over the rocks, well knowing what admirable preserves these aquariums are. Once spied out, it is of no avail to hide amidst the seaweeds, or cower under the shelving ledges draped with coralines. The large pincer-like beak follows, nips him across the back; a skilful jerk gets the head first—then down a lane he goes from which no chirus ever returns.

We might as reasonably attempt to describe, the flushing changing colours of the Aurora Borealis as seen in high latitudes, or the phosphorescence of a tropical sea, or the wing of the diamond-beetle, as to hope by word-painting to give the faintest conception of the colourings that adorn the chirus: red, blue, orange, and

green are so mingled, that the only thing I can think of as a comparison is a floating flower-bed, and even then the gardener's art, in grouping, is but a bungle contrasted with Nature's painting!

There are three species of chirus common along the island and mainland coasts. The one usually sold is *Chirus hexagrammus* (Cuv., Regne An., 'Poiss.,' pl. 83), the Six-lined Chirus.—*Sp. Ch.*: A skinny tentacle over each orbit; palatine teeth none; two muciferous channels, between the lateral line and dorsal fin; scales ciliated.

FLATFISH.—In all the muddy estuaries and on the sandy flats about Puget's Sound, at the mouths of the Columbia and Fraser rivers, several species of flatfish are found in great abundance. These fish have always formed an important article of food to all the sea-fishing Indians, and, since the influx of white settlers, are caught for the supply of the Victoria and San Francisco markets.

Only the larger species are taken with hook and line, the smaller flounders being usually speared by the Indians. And a pleasant sight it is, too, to watch a little fleet of canoes, each one slowly paddled by a dusky squaw gliding along the sandy shallows, the spearman in the bow 'prodding' for the fish hidden in the mud

and sand. The flounder, thus disturbed, ~~scuds~~ along the bottom, and stirs up the sand like a trail, marking its line of progress. The sharp-eyed savage notes the spot where the dirt-line ends, paddles up to it, dashes in the spear, and, quick as thought, transfers the 'flat' fish from its fancied hiding-place to the bottom of the canoe. Immense numbers are taken in this manner at every tide. The following are the species usually sold in the markets:—

Pleuronectes bilineatus (*Platessa bilineata*, Ayres, in Proc. Calif. Acad., 1855, p. 40), the Two-lined Flatfish.—*Sp. Ch.*: The height of the body is a little less than one-half of the entire length, the length of the head nearly one-fourth; snout somewhat projecting, not continuous in direction with the descending profile of the nape; eyes on the right side large, their diameter being two-sevenths of the length of the head, separated by a strong prominent ridge, which is partly covered with scales; lower jaw prominent; a single even row of strong blunt teeth in each jaw, less developed on the coloured side than on the blind; scales very conspicuous, those on the head and on the tail ciliated; lateral line with a strong curve above the pectoral: a second series of pores commences above the eye, and

follows the dorsal profile to the vertical, from the opercular angle, where it terminates—it communicates with the true lateral line by a branch; the dorsal fin rises over about the anterior third of the orbit, and terminates at a distance from the caudal equal to the breadth of the eye; anal spine prominent; pectoral fin half as long as the head. Colour, light greyish-brown, with lighter blotches. More abundant at San Francisco than at Vancouver Island and north of the Fraser.

Pleuronectes digrammus (Günther, Brit. Mus. Catalogue, 'Fishes'), the Two-lined Flounder (Nov. Spec.).—*Sp. Ch.*: The height of the body rather less than one-third of the entire length, the length of the head two-ninths, and that of the caudal two-thirteenths; snout with the lower jaw prominent, equal in length to the diameter of the eye, which is nearly one-fifth of that of the head; maxillary as long as the eye; the upper jaw with a series of twenty-eight small truncated teeth on the blind side, those of the other side being few in number and very small; eyes separated by a very narrow, naked, bony ridge; scales small but conspicuous; lateral line, with a very slight curve above the pectoral; a second series of pores commences above the

eye, and follows the dorsal profile to the twenty-sixth dorsal ray, where it terminates; dorsal and anal rays quite smooth—the dorsal commences above the anterior third of the orbit, and terminates at a distance from the caudal nearly equal to the depth of the free portion of the tail; anal spine prominent—the longest dorsal rays are somewhat behind the middle of the fin, rather shorter than the pectoral, and half as long as the head; uniform brownish; length, eight inches. I obtained this new species of flounder in Mackenzie's Arm, a tidal inlet continuous with Victoria Harbour.

Pleuronichthys guttulatus (Gerard, in Proc. Acad., Nat. Sc. Philadel., 1856, p. 137, and U. S. Pacif. R. R. Expd., 'Fishes,' p. 152).—*Sp. Ch.*: The height of the body is somewhat more than one-half of the total length (with the caudal), the length of the head one-fourth, and that of the caudal one-fifth. The interorbital space is exceedingly narrow, and raised ridgelike; snout very blunt and short; mouth small, with the jaws even. The dorsal commences above the anterior part of the orbit, and terminates at a short distance from the caudal; its longest rays are on and behind the middle of the fin. Scales, very small, cycloid. The lateral line is slightly arched

above the pectoral ; a similar series of pores runs from the upper eye, along the base of the dorsal fin, to about the middle of the length. There is a connecting branch between both lines, across the occipital region. Colour greyish, densely dotted with black and white spots. Common at Vancouver Island and San Francisco. For further description of species, *vide* Appendix, vol. ii.

CHAPTER VI.

HALIBUT FISHING—DOGFISH—A TRIP TO FORT RUPERT—
RANSOMING A SLAVE—A PROMENADE WITH A REDSKIN—BAGGING
A CHIEF'S HEAD—QUEEN CHARLOTTE'S ISLANDERS AT NANAIMO.

HALIBUT.—The Halibut, a giant amongst flat-fishes, is taken by the Indians on the western side of Vancouver Island; a veritable ground-feeder, frequenting deep-sea sandbanks, and devouring anything and everything that comes within reach of his terrible mouth. The halibut, at Vancouver Island, attains to an immense size, 300 lbs. being no unfrequent weight.

The Indians are most skilful in securing this leviathan of the deep, as I had an opportunity of seeing, when visiting the northern end of the island. Picture to yourselves an Indian village, built on a plateau overlooking an open roadstead; a crowd of Indians on the shingly beach, watching the departure of a large canoe, manned by four savages, awaiting my arrival. This being a special occasion, they were more elaborately

painted than usual. A brief description of one will serve to portray the other three. Tailors are entirely unknown in the land of the red-skin; a small piece of blanket or fur, tied round the waist, constitutes the court, evening, and morning costume of both chief and subject.

My crew were *kilted* with pieces of scarlet blanket. Imagine, if you can, a dark swarthy copper-coloured figure leaning on a canoe-paddle, his jet-black hair hanging down nearly to the middle of his back, the front hair being clipped close in a straight line across the forehead. Neither beard, whisker, nor moustache ever adorns the face of the redskin, the hair being tweezered out by squaws in early life, and thus destroyed. A line of vermilion extends from the centre of the forehead to the tip of the nose, and from this 'trunk line' others radiate over and under the eyes and across the cheeks. Between these red lines white and blue streaks alternately fill the interstices. A similar pattern ornaments chest, arms, and back, the frescoing being artistically arranged to give apparent width to the chest; the legs and feet are naked. A 'fire-bag,' made from the skin of the medicine-otter, elaborately decorated with beads, scarlet cloth, bells, and brass buttons, slung round the neck by a broad

belt of wampum, completed the costume of my coxswain.

The canoe was what is commonly called a 'dug-out,' that is, made from a solid log of wood. Coiled round the sharp bow of the canoe, like a huge snake, was a strong line about sixty fathoms in length, made from the inner bark of the cypress, neatly twisted. Lying along each side, extending far beyond both bow and stern, were two light spear-hafts, about sixty feet long; whilst stowed away in the bow were a dozen shorter spears, one end being barbed, the other constructed to fit on the longer spear, but so contrived that the spearman can readily detach it by a skilful jerk. Tied lightly to the centre of each of the smaller spears was a bladder made from sealskin, blown full of air, the line attaching it being about three fathoms in length.

I had hardly completed my investigation of the canoe, its crew, and contents, when, to my intense astonishment, the four Indians lifted me, as they would a bale of fur, or a barrel of pork, and without a word deposited me in the bottom of the canoe, where I was enjoined to sit, much in the same position enforced on a culprit in the parish stocks. I may mention, incidentally, that a canoe is not half as enjoyable as poets and

novelists, who are prone to draw imaginary sketches, would lead the uninitiated to believe. It would be impossible to trust oneself in a more uncomfortable, dangerous, damp, disagreeable kind of boat—generally designated a ‘fairy barque,’ that ‘rides, dances, glides, threads its silvery course over seas and lakes, or, arrow-like, shoots foaming rapids.’ All a miserable delusion and a myth! Getting in (unless lifted, as I was, bodily, like baggage) is to any but an Indian a dangerous and difficult process; the least preponderance of weight to either side, and out you tumble into the water to a certainty. Again, lowering oneself into the bottom is quite as bad, if not worse, requiring extreme care to keep an even balance, and a flexibility of back and limb seldom possessed by any save tumblers and tightrope-dancers. Down safely, then, as I have said, you are compelled to sit in a most painful position, and the least attempt to alter it generally results in a sudden heeling-over of the canoe, when you find yourself sitting in a foot of cold water.

We are off, and, swiftly crossing the harbour, the beach grows indistinct in the distance; but we still see the dusky forms of the Indians, the rough gaudily painted huts, the gleam of many

lodge-fires, and wreaths of white smoke slowly ascending through the still air; the square substantial pickets shutting in the trade-fort, its roof and chimneys just peeping above, backed by the sombre green of the pine-trees, altogether presented a picture novel and pretty in all its details.

A few minutes and we rounded the jutting head-land, keeping close along the rocky shore of the island, gliding past snug bays and cozy little land-locked harbours, the homes and haunts of countless wildfowl; soon we leave the shore, and stand away to sea. The breeze is fresher here, and a ripple, that would be nothing in a boat, makes the flat-bottomed canoe unpleasantly lively. Save a wetting from the spray, and occasional surge of water over the gunwale, all goes pleasantly. The far-away land is barely distinguishable in the grey haze. No canoes are to be seen in the dark-blue water; the only sign of living things—a flock of sea-gulls waging war on a shoal of fish, the distant spouting of a whale, and the glossy backs of the black fish as they roll lazily through the ripple. The line at the bow is uncoiled, a heavy stone enclosed in a net attached as a sinker, a large hook made of bone and hardwood, baited with a piece of the octopus, (a species of cuttle-fish), is made fast to the long

line by a piece of hemp-cord; then comes a heavy plunge of the sinker, the rattle of the line as it runs over the side of the canoe, and—we wait in silence for the expected bite.

A tug, that came unpleasantly near to upsetting all hands, lets us know that a halibut was bolting the tempting morsel, hook and all. A few minutes gave him time fairly to swallow it, and now a sudden twick buries the hook deeply in the fleshy throat; the huge flatfish finds, to his cost, that his dinner is likely seriously to disagree with him, whilst in the canoe all hands are in full employ. The bowman, kneeling, holds on tightly with both hands to the line; the savage next him takes one of the long spears, and quickly places on the end of it a shorter one, baited and bladdered; the other two paddle warily.

At first the hooked fish was sulky, and remained obstinately at the bottom, until continued jerks at the line ruffled his temper, and excited his curiosity sufficiently to induce a sudden ascent to the surface; perhaps to have a peep at his persecutors. Awaiting his appearance stood the spearman, and when the canoe was sufficiently near, in he sent the spear, plucking the long haft or handle from the shorter barbed spear, which remained in the fish, the bladder, floating like a

life-buoy, marking the fish's whereabouts. The halibut, finding his reception anything but agreeable, tries to descend again into the lower regions, a performance now difficult to accomplish, as the bladder is a serious obstacle. Soon reappearing on the surface, another spear was sent into him, and so on, until he was compelled to remain floating. During all this time the paddlers, aided by the line-man, followed all the twistings and windings of the fish, as a greyhound courses a doubling hare.

For some time the contest was a very equal one, after the huge fish was buoyed and prevented from diving. On the one side the halibut made desperate efforts to escape by swimming, and on the other the Indians, keeping a tight line, made him tow the canoe. Evident signs of weariness at last began to exhibit themselves, his swimming became slower, and the attempts to escape more feeble and less frequent. Several times the canoe came close up to him, but a desperate struggle enabled him once more to get away. Again and again we were all but over; the fish, literally flying through the water, sometimes towed the canoe nearly under, and at others spun it suddenly round, like a whipped top; nothing but the wonderful dexterity of the paddlers saved us from instant shipwreck and

the certainty of drowning. I would have given much to have stood up ; but no ; if I only moved on one side to peep over, a sudden yell from the steersman, accompanied by a flourish of the braining-club—mildly admonitory, no doubt, but vastly significant—ensured instant obedience. I forgot cold, wet, and fright, and indeed everything but the all-absorbing excitement attendant on this ocean-chase. The skill and tact of uneducated men, pitted against a huge sea-monster of tenfold strength, was a sight a lover of sport would travel any distance to witness.

Slowly and steadily the sturdy paddlers worked towards the shore, towing the fish, but keeping the canoe stern-first, so as to be enabled to pay out line and follow him, should he suddenly grow restive : in this way the Indians gradually coaxed the flat monster towards the beach ; a weak, powerless, exhausted giant, outwitted, captured, and subdued, prevented from diving into his deep-sea realms by, what were to him, anything but life-buoys. We beached him at last, and he yielded his life to the knife and club of the redskin.

I believe the species to be the *Pleuronectes hippoglossus* of Linnaeus, but of this I am by no means perfectly clear, as I had only an opportunity of examining this single specimen, that I estimated as weighing over 300 lbs. ; and it was

quite impossible to investigate its specific character, inasmuch as the Indians immediately set to work to cut the body in pieces, some to be there and then devoured, after a very brief roasting on a temporary fire; the remainder, packed into the canoe, was taken to the village.

Halibut are said to spawn in the middle of February; the roe, which is bright red, being esteemed a great dainty by all the Coast Indians.

COD.—The true Cod, although I never saw it offered for sale in the Victoria market, is taken both at the northern extremity of Vancouver Island, and near Cape Flattery, at its southern end. The Indians fish for them with hooks and lines, and adopt very much the same system for landing heavy obstinate fish as I have already described as used to subdue the halibut. No regular system of deep sea fishing had, when I left the island, been tried by white men; neither had the trawl ever dragged up the treasures hidden at the bottom; so that deep-sea fish are still comparatively unknown. But of this I am quite sure—whenever fisheries are established along the island coasts, the trawl and deep-sea line, used by experienced hands, will bring up treasures from mines of wealth as yet unworked, to which gold and fur are nothing.

DOGFISH.—The Western Dogfish (*Acanthius Suckleyi*), Grd., Proc. Acad., Nat. Sc. Phil., vii. 1854.—*Sp. Ch.*: Head contained in a sixth of the entire length; snout blunt, nostrils near to its apex. Eye large and bright, sea-green in the newly-taken fish. Anterior margin of the first dorsal, midway betwixt the pupil and anterior margin of the second dorsal. Colour reddish brown, above thickly spotted with white, over-spread with bronze reflections.

This most predaceous race of sharks, although they never grow to a size dangerous to man, are nevertheless most bloodthirsty and implacable enemies to all the finny tribes inhabiting the waters of the North-west. They appear to live everywhere, in every harbour, up the long inland canals, in the lagoons, and nearly as far as the tide flows; the dogfish is ever to be found up the tidal rivers. Hunting in packs like wolves, they often chase a shoal of fish upon the shingle, then bite and maim six times as many as they can possibly eat. I have often seen them seize dead and even wounded birds, drag them below the surface, and tear them into shreds.

Angling where there are dogfish, and it is hard to discover a spot where they are not plentiful, is simply to waste time, and lose one's temper; your

bait hardly touches the water ere it is gorged, and an ugly dogfish dangles at the end of the line. To unhook the thief is a service of danger, unless knocked senseless, and his fearfully-armed jaws are propped open with a piece of stick. But, with all his faults, the dogfish is most useful and valuable to the Indians, who spear incredible numbers, split them, and take out their livers. From these fatty livers a quantity of clear oil is extracted, by heat and pressure, applied in such a clumsy manner, that at least one-third is wasted. I was credibly informed that one small tribe of Indians, living on the west coast of Vancouver Island, by their bungling process of oil-making, managed to obtain seven cwt. of oil in one season: surely oil making alone would pay a company a handsome return for a judicious outlay of skill and capital. Several naval surgeons have assured me they had fairly tested its curative powers—in diseases where oil is said to be efficacious—and found it in every respect quite equal to the finest cod-liver oil.

Whilst occupied in collecting the fishes previously described, the Honourable Hudson's Bay Company's steamer 'Otter' was about to make her usual trip to Fort Rupert, in order to

carry up the necessary supplies to the chief trader in charge of the fort, and bring back to Victoria the furs traded during the year. Being a good opportunity to visit so remote a part of Vancouver Island (not accessible, at that time, in any other way), leave was obtained from His Excellency the Governor, and a passage provided for me.

On a bright but cold morning in October the 'Otter' twisted, puffed, and worked her way through the somewhat intricate passage leading out of Victoria Harbour. Leaving the harbour, the scenery opens out like a magnificent panorama, indescribably wild and beautiful. In front, the sharp jagged mountains of the coast range, wooded to the sea-line, tower in the far distance to the regions of eternal snow; to the left, the rounder hills of the island slope easily to the water's edge, in grassy glades and lawnlike openings, belted with scrub-oaks; higher up, the hillsides are overshadowed by the Douglas pines and cedars; whilst just visible in our course, like a green speck, is the famed island of St. Juan; and bending away to the right, as far as eye could reach, dense forests look like one vast unbroken sea of green.

We had a delightful run along the coast and amidst islands, and anchored in the evening near

the narrows. These same narrows are only used by the initiated as a short cut, being too risky for large vessels navigated by unskilled hands. There is a channel, a quarter of a mile long and seventy yards wide, between a small island and the Island of Vancouver. Through this rocky canal the tide rushes with fearful velocity. We ran it safely in the morning, although it struck me as being the most ticklish bit of navigation I ever experienced. Through these narrows, we were soon in Nainimo, where we called for a supply of coals; the town, at this early stage of its history, consisting of about a dozen log-shanties, inhabited by the coal-miners and employés of the fur-trading establishment.

Whilst 'coaling,' a deputation of Indian braves, headed by a young chief, waited on the captain of the steamer. Squatted in a circle on the deck, and the all-essential pipe smoked, the object of their visit was disclosed. The Fort Rupert Indians, residing at the Indian village and trading-post we were *en route* to visit, had very recently made a raid on the Nainimo savages. In the foray, the old chief had been killed, several braves seriously injured, and, what was worse than all, the favourite wife of the deceased dignitary had been seized, and carried off a slave. The young

chief, it seems, had loved the wife of his predecessor, and was willing to pay any ransom for his lost darling. After a long 'wa-wa' (talk), the captain consented to effect a purchase, if possible, and bring back, on our return, the lost one to the arms of her sable lover.

We had a pleasant run across the Gulf of Georgia, and anchored at 10 P.M. in Billings' Harbour (much like a small duck-pond), in Faveda Island. The next morning, again under weigh at 6 A.M., raining, as the captain said, 'marlinespikes,' we steamed past a group of islands, behind which is Malospina Strait. From this strait, Jarvis's Inlet runs like an immense canal for a distance (I believe) of fifty miles inland.

Here the gulf widens out like the open sea, and little can be seen of the land until the extreme south-east point of Valdes Island is reached, known as Point Mudge, betwixt which and Vancouver Island is a narrow channel, not more than a mile in width, called Discovery Passage.

About a mile from its entrance, we passed a large Indian village, the home of the Tah-cul-tas, a powerful band, of most predatory habits, and generally at war with the different tribes north and south of them; they own a large fleet of

canoes, a great many slaves, and scalp and plunder all they can lay hands on.

For a distance of fourteen miles Discovery Passage is much the same width, until reaching Menzies Bay, where the rapids commence. At the base of these rapids, the channel, barely a quarter of a mile wide, suddenly opens out into a large pond-like space. The tide rushes down the narrow passage at the rate of ten knots an hour, and to get up through it was as much as our little steamer could accomplish. Panting and struggling, and sometimes hardly moving, at others she was carried violently against the shore, until by slow degrees she breasted the current and got safely through. I could not help wondering how Captain Vancouver ever managed to get his ship up this terrible place, so difficult even when aided by the power of steam.

Above the rapids the passage again widens to Point Chatham, the north-west termination of Discovery Passage. We puff by Thurlow Island, divided from Valdes Island by the Nodales Canal, and anchor in a snug harbour named Blenkinsop's Anchorage. We start again at sun-up, the fifth morning since leaving Victoria. As we steamed steadily along through Johnston's Straits, I could recall to my remembrance

no scenery that was comparable, in wild grandeur and picturesque grouping, to the scenery on my left. The coast-line of Vancouver Island presented a series of small projecting headlands; the bays and creeks between, seldom rippled by the breeze, are very Edens for wildfowl. In the background, the hills rise sharp and conical, at this time crowned with snow, but all alike densely timbered. In the distance, Hardwicke Island, like a floating emerald, hid the water beyond it. To the right, islands of all sizes and shapes, so thick that one might suppose it had rained islands at some time or other: on the least of them grew pine-trees, any of which would have made a mainmast for the largest ship ever built. I have again and again threaded the intricate passages through the 'Lake of a Thousand Islands,' in the Great St. Lawrence; but I say, without fear of contradiction, that the scenery from Chatham Point to the mouth of the Nimkish river is wilder, bolder, and in every respect more beautiful, lovely as I admit the Canadian scenery to be.

The ship-channel hugs the shore of Vancouver Island, passing close to Cormorant, Haddington, and Malcolm Islands, and the mouth of the Nimkish river, navigable for canoes some con-

siderable distance. This stream is used by the Hudson's Bay traders to reach the western side of Vancouver Island. Ascending it in canoes as far as practicable, about two days' walking brings them to Nootka Sound.

At the mouth of the river, I saw the village of the Nimkish Indians, situated on a table-land overhanging the sea, and inaccessible save by ascending a vertical cliff of smooth rock—a feat nothing but a fly could manage, unaided; but the redskins have a ladder, made of cedar-bark rope, which they can haul up and lower at will. The ladder up, the place is impregnable. Safe themselves, they can quietly bowl over their enemies, and sink their canoes.

These Nimkish Indians speak of another tribe that they call Sau-kau-lutuck, who have never seen or traded with white people. Their story, as interpreted for me by Mr. Moffat, the chief trader at Fort Rupert—who told me he quite believed it to be true—was as follows:—

‘In crossing over to the west side of the island, on a war-path, the Nimkis discovered these Indians by accident, took several of them prisoners, whom they subsequently used as slaves, taking also skins, and what other property they had worth plundering. They are said to live on the

edge of a lake, and subsist principally on deer and bear, and such fish as they can take in the lake. They own no canoes, neither do they know the use of firearms, their only weapons being the bow, arrow, and spear.'

The wind came on to blow as we left this interesting spot, and soon increased to a gale from the south-east, making the Otter rock most unpleasantly in the cradle of the deep. About 10 A.M. we ran into Beaver Harbour, our destination. This so-called harbour, being nothing more than an open roadstead, is disagreeably rough; a heavy sea rolls angrily in, dashing in foamy breakers on the rocky coast.

We anchor about a mile from shore, the captain deeming it unsafe to venture nearer. To announce our arrival, a gun is to be fired: this, I observed, was rather a service of danger to the sailor who had to touch it off, as it was just an equal chance whether the bulk of the charge came through the barrel or the touch-hole; the latter having become so capacious from rust and long usage, as to necessitate the employment of an enormously long wand, with a piece of lighted slow-match tied to the end of it. All hands having cleared away, and carefully concealed themselves, the wand slowly appears

from a secure hiding-place, and the wheezy bang proclaims 'all's safe.'

The report was still echoing through the distant hills, when countless tiny specks were discernible, dancing over the waves like birds. On they came, a perfect shoal of them, nearer and nearer, all evidently bound for the ship. I could make out clearly now, that these specks were canoes filled with Indians. By this time our boat was lowered; how I got into it, I never clearly remember: I have a dim recollection of descending a rope with great rapidity, and finding myself sprawling in the bottom, and being dragged up by the captain, much after the fashion adopted by clowns in a pantomime to reinstate the prostrate pantaloon upon his legs. At any rate I was safe, and the boat, propelled by four sturdy rowers, neared the shore.

On looking round, I observed the canoes had all turned towards us, and we were soon surrounded by the most extraordinary fleet I had ever beheld. The canoes were of all sizes, varying from those used for war purposes, holding thirty men, to the cockleshell paddled by a squaw. With the exception of a bit of skin, or an old blanket tied round the waist, the savages were all perfectly nude; their long black hair hung in tangled elf-locks down their backs, their

faces and bodies painted in most fantastic patterns, with red and white. Keeping steadily along with us, they continually relieved their feelings by giving utterance to the most wild and fiendish yells that ever came from human throats.

As we neared the landing, I could see the chief trader of the Hudson's Bay Company, conspicuously white amidst a group of redskins, waiting to receive us. The boat grated on the shingle some distance from the beach, white with spray. 'Surely you don't expect me to go ashore like a seal?' I appealingly enquired of the captain. Before he had time to reply, four powerful savages, up to their waists in water, fisted me out of the boat; and two taking my heels, and two my shoulders, they bore me safely to the shore.

Having handed my letters of introduction from his Excellency the Governor to the chief trader, I was presented to the chiefs as a *Hyas tyee* (great chief), one of 'King George's' men. So we shook hands, and I attempted to move towards the fort; it was not to be done. To use the mildest term, I was 'mobbed;' old savages and young savages, old squaws and young squaws, even to boy and girl savage, rushed and scrambled to shake hands with me. Had I been a 'pump'

on a desert, surrounded by thirst-famished Indians, and each arm a handle, they could not have been more vigorously plied. Being rescued at last by the combined efforts of trader and captain, I was marched into the fort, the gates shut with a heavy clang, and most thankful was I to be safe from any further demonstrations of friendship. The evening passed rapidly and pleasantly; mine host was a thorough sportsman, full of anecdote, and hospitable to a fault.

Awaking early, I wandered out, and up into the bastion of the fort. The sun was creeping from behind the ragged peaks of the Cascade Mountains, tinting with rosy light their snow-clad summits; the wind had lulled, or gone off to sea on some boisterous errand; the harbour, quite smooth, looked like burnished silver. There was a wild grandeur about the scene, that awoke feelings of awe rather than admiration; everywhere vast piles of craggy mountains, clad from the snow-line to the sea with dense pine-forests; not an open grassy spot, or even a naked mass of rock, peeped out to break the fearful monotony of these interminable hills.

The trading-post is a square, enclosed by immense trees, one end sunk in the ground; the trees are lashed together. A platform, about the

height of an ordinary man from the top of these pickets, is carried along the sides of this square, so as to enable anyone to peep over without being in danger from an arrow or bullet. The entrance is closed by two massive gates, an inner and outer; all the houses—the chief trader's, employés', trading-house, fur-room, and stores—are within the square. The trade-room is cleverly contrived so as to prevent a sudden rush of Indians; the approach, from outside the pickets, is by a long narrow passage, bent at an acute angle near the window of the trade-room, and only of a sufficient width to admit one savage at a time. (This precaution is necessary, inasmuch as, were the passage straight, they would inevitably shoot the trader.)

At the angles nearest the Indian village are two bastions, octagonal in shape, and of a very doubtful style of architecture. Four embrasures in each bastion would lead the uninitiated to believe in the existence of as many formidable cannon, with rammers, sponges, neat piles of round-shot and grape, magazines of powder, and ready hands to load and fire—and, at the slightest symptom of hostility, to work havoc and destruction, on any red-skinned rebels daring to dispute the supremacy of the Hudson's Bay

Company. Imagine my surprise, on entering this fortress, to discover all this a pleasant fiction; two small rusty carronades, buried in the accumulated dust and rubbish of years, that no human power could load, were the sole occupants of the mouldy old turrets.

The bell for breakfast recalling me, I jokingly inquired of the trader if he had ever been obliged to use this cannon for defensive purposes. He laughed as he replied, 'There is a tradition that, at some remote period, the guns were actually fired, not at the rebellious natives, but over their heads; instead of being terror-stricken at the white man's thunder, away they all scampered in pursuit of the ball, found it, and, marching in triumph back to the fort-gate, offered to trade it, that it might be fired again!'

Breakfast finished, the trader, captain, and myself started for the village. Clear of the gates, we scrambled down a rocky path, crossed a mountain-burn, dividing the Indians from the fort, and entered 'the city of the redskins,' which consists of a long row of huts, each hut nearly square, the exterior fantastically frescoed in hieroglyphic patterns, in white, red, and blue; having however a symbolical meaning or heraldic value, like the *totum* of the Indians east of the

Rocky Mountains; four immense trees, barked and worked smooth, support each corner; the tops are carved to resemble some horrible monster: the hut is constructed of cedar-plank, chipped from the solid tree with chisels and hatchets made of stone: many hands combine to accomplish this; hence a hut becomes the joint property of several families. Five tribes live in this village:—

Qua-kars, numbering about 800 warriors.

Qual-quilths	„	„	100	„
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Kum-cutes	„	„	70	„
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Wan-lish	„	„	50	„
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Lock-qua-lillas	„	„	80	„
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The entire population, even to the dogs, turned out on our advent; it was puzzling to imagine where they all came from. We soon formed the centre of the vilest assemblage man ever beheld. The object of our visit made known, a ring was immediately formed by chiefs and braves, the squaws and children being outside. Had any charming princess, captive in an enchanted castle, been guarded by such a collection of painted ragamuffins as now surrounded us, he would have been a valorous knight that dared venture to release her.

The first question discussed being the price, a

much larger sum was asked than we felt disposed to pay. Although the slave belonged solely to one Indian, the power to sell resting with him only, still every one had their say. Men gurgled and spluttered strange unintelligible noises, women chattered and screamed like furies, whilst children engaged in small battles outside the ring.

Thirty blankets and two trade-guns—equal to about 50*l.* sterling—were the terms at last agreed on. We then adjourned to the shed where the slave was a prisoner. I was in a great state of expectation, picturing to myself an Indian Hebe, limbs exquisitely moulded, native grace and elegance in every movement, gorgeous in ‘wampum,’ paint, and waving feathers, such as I had read of as ‘Laughing Water,’ or ‘Prairie Flower.’

Being carried, so to speak, into the shed—a waif in the stream of savages rushing like a human torrent to get in—with all the breath squeezed out of me, I was deposited somewhere; but as my head was enveloped in a dense cloud of pungent smoke, it was some time ere I discovered I was close to the captain. ‘Sit down,’ he roared; ‘you will die of suffocation if you keep your head in the smoke.’ At once I seated

myself on the floor, and now quite understand what being suffocated in a chimney is like.

Once more enabled to see, it was easy to discover the secret: there being no place for the smoke to escape, it accumulates at the top of the shed, and one literally, not figuratively, 'lives under a cloud.' There was a hum and a burr, as in a nest of angry hornets; a din increased by the dogs, that fought and rolled in where I sat; and being by no means particular whether they bit my legs or any other man's, it required unwonted agility to keep clear.

During an interval of peace, it was easy to make out that the slave was coming. Alas! how fleeting are imaginary pictures—poetic dreams—castles in the air! Half crouching, and waddling rather than walking, came my ideal; her only covering, a ragged, filthy old blanket, her face begrimed with the dirt and paint of a lifetime; short, fat, repulsive, the incarnation of ugliness, a very Hecate! All my romance vanished like a dissolving-view. For this had I been squeezed nearly to death, suffocated, poisoned with a noxious stench, my legs imperilled by infuriated curs, my ears deafened, half devoured by insatiable blood-suckers?—to aid in paying 50*l.* for the ugliest old savage eyes ever beheld!

All the chiefs assembled at the fort in the evening to receive payment, and hand over the slave. Squatting on their heels, nose and knees together, their backs against the wall, they formed a circle. The pipe produced (nothing can be done without it); I say pipe, for *one* only is used; filled and lighted, it passes from mouth to mouth; each, taking a good pull, puffs the smoke slowly from his nostrils. The thirty blankets and two guns being piled in the centre of this strange assemblage, the slave was led in. Each blanket underwent a most careful inspection; the guns, snapped and pointed, were finally approved of. A husky grunt, from each of the council, denoting general approval, the guns and blankets were carried off in triumph, and we became the fortunate possessors of this strange purchase.

Whilst in the fort I was tolerably exempt from the insatiable and most annoying curiosity, that induces Indians to watch everything a stranger does. One oily old chief, however, always contrived to get into my room in time to see me dress. He used to stalk in, squat down rolled in a dirty blanket, and testify his pleasure by a series of grunts slightly varied in tone. He was certainly the most blubbery-looking

man I ever beheld. Everything about him was suggestive of oil, from his head to his heels, blanket included; like a compound of salmon and seal's flesh, he smelt quite as oily as he looked. Outside, however, there was no help for it: go where I would, a bodyguard of savages (real untamed savages too, not semi-civilised articles) was always in attendance.

Once I managed to escape through the pickets at the back of the fort, and stealthily reaching the beach, under cover of the trees, imagined myself safe. A light misty rain fell thickly, and a flock of sanderlings, running along in the ripple, completely absorbed my attention. I was suddenly startled by hearing the 'crunch, crunch' of a foot in the shingle behind me. I had looked right and left on reaching the beach, but not a trace of Indian was visible. Turning suddenly round, you can picture my surprise at finding myself face to face with a savage, unclad from head to heel, carrying—what should you imagine?—not a scalping-knife, or a war-club, or bow or spear or gory scalp: it was an immense green gingham umbrella, a thoroughbred 'Gamp,' with horn crook, battered brass ferule, furled with a ring such as curtains are hung on. He politely offered me a part, and scarcely deeming it safe

to refuse, I paraded the beach, linked arm-in-arm with the ugliest specimen of humanity eyes ever beheld. I wonder if, before or since, a naked savage and civilised man ever walked together on the sea-beach, listening to 'what the wild waves were saying,' sheltered from the rain by a green gingham umbrella! I trow not. I should have been no more astonished at seeing a seal, or old Neptune himself, with an umbrella, than I was at a naked Indian so protected on the beach at Fort Rupert.

This was not my only adventure whilst staying at the fort. The beach runs out very flat for a long distance seaward; the rocks appear a slaty kind of shingle, with seams of coal cropping out in every direction. The pines (*Abies Douglassii*) grow down to highwater-mark, attaining a height of 250 feet and over, straight as a flagstaff. On the branches are placed quaint-looking affairs, that you discover, on inquiry, to be coffins; but how the friends of the departed get the boxes up into the trees, or how they keep them there when they are up, is more than I can tell. The coffin is usually an old canoe, lashed round and round, like an Egyptian mummy-case, with the inner bark of the cedar-tree; but of this, and other

singular customs, I shall have to speak more at length in a future chapter.

Near one of these arboreal cemeteries, I observed a high pole, and dangling from it a head, fresh, bloody, and ghastly; the scalp had been removed, and a rope, passing through the under-jaw, served to suspend it. Horribly revolting as the face appeared, still I could not help going close to it. Never had I seen so singular a head; it looked in shape like a sugarloaf, the apex of the skull terminating in a sharp point. On returning to the fort, I inquired if they could tell me anything about this mysterious head. It appeared that, a day or so before our arrival, a war-party of the Qua-kars had returned from a raid on the mainland coast, and brought with them a number of slaves. (Prisoners taken in war, or in any other manner, are invariably used as slaves, bought and sold, whipped or killed, as best befits the whim or caprice of their owner.) Amongst the wretched captives, was a chief. Soon after landing, he was made fast to a temporary cross erected on the beach, shot, scalped, and beheaded, and it was his head I had seen in my rambles. On hearing further that the tribe to which he belonged was one that elongate instead of flatten the head, I de-

fish ought to be sent to the king, though how far the sovereign's rights in the matter are actually considered, seems to be somewhat doubtful. It is said, however, that the sturgeon was exclusively reserved for the table of the king in the time of Henry I.

In the Fraser and Columbia rivers, and in all the streams of any magnitude from latitude $46^{\circ}19'$ N. to Sitka, latitude 53° N., the sturgeon is found abundantly; as also in Northern Asia, where it forms an article of vast commercial value, the well-known and much-prized caviare being made from its roe, and that almost indispensable household necessary, isinglass, from its air-bladder. The long ligamentous cord, traversing the entire length of the spine, constitutes another delicacy, called *vesiga*, much relished by the Russians. The flesh also is eaten, cooked in various ways, and held in no mean estimation. Turkey, Italy, Germany, and Greece (especially the two latter) are great markets for caviare.

Pliny speaks of the sturgeon as being in great repute among the Greeks and Romans: 'the cooked fish was decked with garlands, as were the slaves who carried it to table;' and altogether it was an affair of great pomp and ceremony, when a sturgeon was to be demolished.

Sturgeon arrive in the Columbia early in February, and a little later in the Fraser, although a great number above the Kettle Falls, at Fort Colville, must remain permanently in the fresh-water. They ascend the rivers to incredible distances, in the Fraser as high as Fraser Lake, quite up in the Rocky Mountains. In the Columbia sturgeon have been taken eight hundred miles above the Kettle Falls, which are, speaking roughly, eighteen hundred miles from the sea, and, in accomplishing this, several very serious obstacles have to be overcome. Up the Snake river, at the great Shoshonee Falls (a salmon-station of the Snake Indians), sturgeon are often taken. The Snake river, tributary to the Columbia, is about fourteen hundred miles from the sea.

One would never imagine a fish clad in stiff unyielding armour could ascend rapid torrents and leap falls that puzzle even the lissom salmon; but the strength of the sturgeon is immense, and the power it can exert with the tail would be almost incredible to those, who have never seen the rapid twists, plunges, and other performances this fish goes through, when it has a barbed hook in the jaws, or a spear between the joints of its mail.

terminated at any risk to have the skull.* Extreme caution was needed, or a like fate would probably be mine; a white chief's hairless head might possibly adorn the same pole as that of the painted savage. I made several attempts, but each time signally failed to accomplish my purpose.

The night preceding our departure, all hopes of obtaining the coveted head were nearly abandoned. Fortune at last smiled upon me; unobserved, I upset the pole, and *bagged* the head; and pushing it into my game-bag, got safely into the fort. Still in terror of being seen, I hid it in the bastion, and eventually headed it into a pork barrel, with stones and sand; then had it rolled boldly out, and put on board the steamer.

On our departure the following morning, I was rejoiced to find the head had not been missed, but somewhat frightened, on learning I was to be paddled to the steamer, in the state-canoe of the chief to whom the trophy belonged. In grand procession, we marched from the fort to the canoe, marshalled by the dingy dignitary, who, in happy ignorance of the wrong I had done him, was all smiles and grins; the final hand-shaking being accom-

* Vide Illustration. vol. 2 p. 103

plished, I was lifted into the canoe in the same fashion as I had been previously lifted out, and rapidly reached the steamer.

The chief came on board the steamer whilst the anchor was being weighed. Imagine what I felt when he seated himself deliberately upon the cask wherein I had hid his property. The wished-for moment came, the wheels splashed slowly round, my plundered friend was bowed over the side, and not until the smoke of the lodge-fires, and the fading outline of the village, grew dim in the distance, did I feel my scalp safe. The head is now in the Osteological Room of the British Museum, and well worth investigation by any who may be curious to compare the effect of circular pressure with that of the flat-head.* Skulls similarly flattened were also brought by me from Vancouver Island.

We again called at Nanaimo on our return, and, whilst 'coaling,' delivered the ransomed lady safely into the hands of her owner. At the same time three hundred Indians from Queen Charlotte's Island landed, *en route* to Victoria, arriving in large canoes, each holding about twenty Indians and their baggage. These canoes were not at all similar to any I had seen

* *Vide Illustration, vol. 2 p. 103*

at Fort Rupert, or to those used by the Coast and Fraser river Indians. The shape was similar to the boats one sees in very old pictures, filled with sailors in armour, the bow and stern carved to represent a neck, bearing on it some hideous grinning monster's head.

Their chief, named Edin-saw, once saved the crew of a small schooner, the 'Susan Sturges,' from being killed by the islanders under his control. The vessel was wrecked on Queen Charlotte's Island, and the crew subsequently ransomed. This little army of savages reached Victoria safely, having taken four months to make the voyage; threading all the difficult and dangerous straits, with the risk of capture from other tribes, exposed to all the vicissitudes of weather, in open canoes as easily upset as a child's cradle.

Reaching Victoria in safety, I proceeded up the Fraser, and for the first time witnessed sturgeon-spearing.

CHAPTER VII.

STURGEON-SPEARING—MANSUCKER—CLAMS.

THE Sturgeon found in North-western waters differs only in some unimportant specific distinctions from the one living in the pond of the Zoological Society's Gardens, in the Regent's Park. *Accipenser transmontanus* is the name given by Sir J. Richardson to sturgeon that frequent rivers that flow into the St. Lawrence, on the east side of the Rocky Mountains, but unknown in streams that fall into the Arctic Ocean. On the western side sturgeon abound in the Columbia, Fraser, and most other rivers as far north as lat. 53° N. It is certainly not a handsome fish to look at, reminding one of a shark in armour; yet, clad as he is from head to tail in bony mail, every movement is easy and graceful.*

Sp Ch.—Five rows of plates encase the body: the row along the back is most prominent, and contains fifteen shields. The cheeks are flat, the

snout terminating in an acute point, remarkably flexible and trunklike in its movements. Four barbels dangle from beneath the snout, situated about mid-distance between its point and the orbit. The mouth is underneath, resembling a huge flabby sucker in the freshly-caught fish. Nevertheless, as his habit is to prowl about the mud and gravel at the bottom, it is in reality the very best kind of mouth that could have been given. The barbels that hang before are clearly delicate feelers, intended to give warning, that game suitable for food—disturbed probably by the flexible nose—is near; the nose is employed to stir up the mud, turn over stones, or in exploring the hiding-places of prey amidst the rocks and heavy boulders. The eyes are small and golden-yellow in the newly-caught fish, but change immediately after death.

The great extent and strength of the pectorals, which are nearly horizontal, show us that, in addition to their acting as oars and rudder, they are also powerful assistants in bringing the great fleshy mouth to bear upon anything discovered by the barbels. Female fish are taken full of roe in the Fraser during the month of June, and sometimes later; but where they deposit the ova

or what becomes of the young after leaving the eggs, are mysteries. I never saw a small sturgeon, but have no doubt most of the young fish descend to the sea, although it is equally certain numbers remain entirely in the fresh-water. Madame Sturgeon's family is by no means a small one: a bushel of eggs is not an unusual quantity for a female fish to yield; a great many thousands, although I do not know how many eggs a bushel contains. The Indians dry these eggs in the sun and devour them with oil, as we eat currants and cream. It would surely pay to prepare caviare on the Russian plan, even to send it to the English market. A rough kind of isinglass was at one time prepared by the Fraser river Indians and traded by the Hudson's Bay Company, but even that branch of industry has ceased to flourish since the 'Golden Age.' Indians are exceedingly fond of sturgeon-flesh, and usually demand a high price for it.

Few fish have a wider geographical range than sturgeon. On our own coasts, we find them frequenting the mouths of rivers and muddy estuaries. When caught in the Thames, within the jurisdiction of the lord mayor of London, it is considered a royal fish; implying, that the

The first glance at a sturgeon would lead any one accustomed to fish, to decide at once that it must be a ground-feeder: the form and position of the mouth, the lengthened snout, the barbels, the ventral fins so far back, the large size of the pectorals—as I have already stated—all clearly evidence a habit of grubbing-up food of various kinds near the bottom, and browsing off shelled molluscs adhering to sticks or stones. They also indulge in small fish: eulachon are oily dainties they seem particularly to appreciate; and the Indians say sturgeon are never so fat and good as in 'eulachon time.' Small blame to the sturgeon for appreciating such delicious fish.

During the time the Fraser and Columbia rivers are rising,—and the rise is very rapid, about thirty feet above the winter level, owing to the melting snow,—sturgeon are continually leaping. As you are paddling quietly along in a canoe, suddenly one of these monsters flings itself into the air many feet above the surface of the water, falling back again with a splash, as though a huge rock had been pitched into the river by some Titan hand. It appears to be only play, as they never leap for insect-food; neither have I ever observed them do it during low-water; perhaps

the intense cold of the snow-water begets a desire for exercise.

The systems of catching sturgeon in use amongst the Indians of the Fraser and Columbia rivers are widely different, as indeed are all their modes of taking fish. This mainly arises from the fact of the Columbia river having numerous deep falls, that impede the ascent of all fish going up to spawn. These falls, as I have said, are quite impassable for even the salmon until the snow-water floods the river. The Fraser, on the other hand, offers no hindrance at all until after Fort Hope is passed, and the principal Indian fishing-stations are all below this point: hence it is that on the Columbia, the fish, both salmon and sturgeon, are speared, trapped in baskets or weirs, and the sturgeon also taken with hook and line; whereas, on the Fraser, salmon are principally taken in nets, and sturgeon speared.

I shall first describe the mode adopted by the Indians of the Columbia to catch sturgeon with hook and line. The best months for fishing are February and March, and the time of day either early in the morning, or late in the evening. The Dalles is a favourite fishing-station.

The first thing is to prepare the bait. The old

wooden fish-hook is now amongst the things that *were*, its place having been supplied by its civilised Birmingham brother, bartered by the Indians from the Hudson's Bay Company. The fishing line is either made of native hemp, or the inside bark of the cypress-tree spun into cord. The bait is a long strip cut from the under-side of a trout, at one end of which the point of the hook is inserted; the strip being then wound tightly and evenly round the hook, and up the line about three inches, the silvery side outermost. It is then firmly whipped over with white horsehair, a pebble slung on as a sinker, and the deception is complete. Five or six long barbed spears are stowed away in the canoe, the line coiled carefully in the bow, and the baited hook laid on it. Two wily redskins man this frail bark, the paddler squatting on his heels in the stern, the line-man standing in the bow.

A few skilful turns of the paddle sends the canoe to the mudbank on which King Sturgeon is dozing, and awaiting his matin or vesper meal. The dainty-looking morsel, bearing all the external semblance to a fish (but, like the Trojan horse, pregnant with mischief), sinks noiselessly and slowly to the bottom; the canoe drifts with the current, and in this manner the

bait is towed along ; it nears the sturgeon's nose, and, being far too tempting to be refused, the great pendulous lips close upon it ; but ere it reaches the gullet, a sharp twitch of the line buries the hook in the tenacious gristle. At once discovering he has been miserably done, anger and obstinate resistance are in the ascendant ; so he comes to the surface with a rush and a splash.

The paddler now exerts all his skill to keep a slack line, for the hooked fish would otherwise inevitably upset the canoe ; the bowman, with the line in one hand and a spear poised in the other, quietly bides his time ; then he hurls the spear into the sturgeon's armour-clad back ; down darts the fish, but soon returns to the surface, when in goes another spear, and so on again and again, until, towed ashore, it is dragged out of the water with a powerful gaffhook. Large numbers besides such as are thus speared are netted in passing through the narrow rock-channels.

On the Fraser river sturgeon-spearling is the most exciting sport imaginable. Hooking, playing, and landing a noble salmon is an achievement every fisherman is truly proud of ; but I unhesitatingly assert that to spear and land a

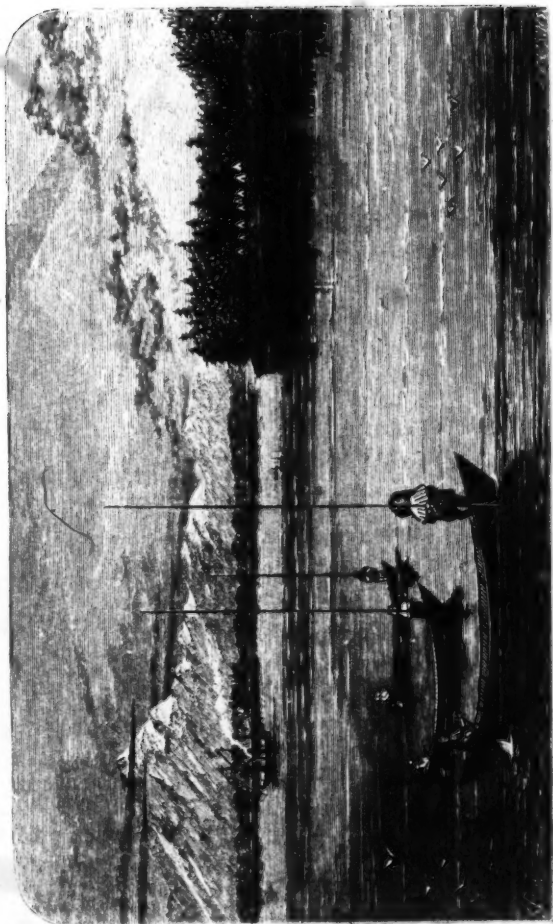
sturgeon five or six hundred pounds in weight, with only a frail canoe, which the slightest inequality of balance will upset in an instant, requires a degree of skill, courage, and dexterity that only a lifetime's practice can bestow.

I have already said the Fraser has no falls below Fort Hope, but a great many stiff rapids; below these rapids it widens out into long slowly-running shallows, generally speaking having large sand and gravel-banks—*bars*, as the miners call them, and on these bars the Indians live during the fishing-season. The time for fishing being generally soon after sunrise, four canoes, each manned by two Indians, usually start for sturgeon-capture; the paddler, who squats in the stern, looks in the direction in which the canoe is to go, not, as we sit in rowing, with our backs to the bow, but facing it; he is always chosen for his greater strength, tact, and dexterity with the paddle, for on his skill depends in a great degree the safety and success of the spearman.

The spearman stands in the bow, armed with a most formidable spear—the handle,* from seventy to eighty feet long, is made of white pine wood; fitted on the spear-haft is a barbed point, in shape very much like a shuttlecock, supposing

* *Vide Illustration.*

2



STURGEON-SPEARING ON THE FRASER.

each feather represented by a piece of bone, thickly barbed, and very sharp at the end. This is so contrived that it can be easily detached from the long handle by a sharp dexterous jerk. To this barbed contrivance a long line is made fast, which is carefully coiled away close to the spearman, like a harpoon-line in a whale-boat.

The four canoes, alike equipped, are paddled into the centre of the stream, and side by side drift slowly down with the current, each spearman carefully feeling along the bottom with his spear, constant practice having taught the crafty savages to know a sturgeon's back when the spear comes in contact with it. The spear-head touches the drowsy fish—a sharp plunge, and the redskin sends the notched points, through armour and cartilage, deep into the leather-like muscles. A skilful jerk frees the long handle from the barbed end, which remains inextricably fixed in the fish; the handle is thrown aside, the line seized, and the struggle begins.

The first impulse is to resist this objectionable intrusion, so the angry sturgeon comes up to see what it all means : this curiosity is generally repaid by having a second spear sent crashing into him. He then takes a header, seeking safety in flight, and the real excitement com-

mences. With might and main the bowman plies the paddles, and the spearman pays out line, the canoe flying through the water. The slightest tangle, the least hitch, and over it goes; it becomes, in fact, a sheer trial of paddle *versus* fin. Twist and turn as the sturgeon may, all the canoes are with him: he flings himself out of the water, dashes through it, under it, and skims along the surface; but all is vain—the canoes and their dusky oarsmen follow all his efforts to escape as a cat follows a mouse.

Gradually the sturgeon grows sulky and tired, obstinately floating on the surface. The savage knows he is not vanquished, but only biding a chance for revenge; so he shortens up the line, and gathers quietly on upon him, to get another spear in. It is done—and down viciously dives the sturgeon; but pain and weariness begin to tell, the struggles grow weaker and weaker, as life ebbs slowly away, until the mighty armour-plated monarch of the river yields himself a captive to the dusky native in his frail canoe.

THE CLAM.—Amongst the edible shellfish found on the coasts of Vancouver Island and British Columbia, the Great Clam, as it is there styled (*Lutraria maxima*), or the Otter-shell of conchologists, is by far the most valuable. Clams

are one of the staple articles of winter food on which all Indian tribes in a great measure depend who inhabit the north-west coast of America. The clam to the Indians is a sort of molluscous cereal, that they gather and garner during the summer months; and an outline sketch of this giant bivalve's habits and style of living, how captured, and what becomes of it after being made a prisoner, may be interesting; its habits, and the uses to which, if not designed, it is at least appropriated, being generally less known than its minute anatomy. Clams attain an immense size; I have measured shells eight inches from the hinge to the edge of the valve. We used them as soap-dishes at our head-quarters on Vancouver Island.

The clam has a very wide range, and is thickly distributed along the mainland and Vancouver Island coasts; his favourite haunts are the great sandbanks, that run out sometimes over a mile from the shore. The rise and fall of the tide is from thirty to forty feet, so that at low-water immense flats or beaches, consisting of mud and sand, are laid bare.

There is nothing poetical about the clam, and its habits are anything but clean; grovelling in the mud, and feeding on the veriest filth it can

find, appears to constitute the great pleasure of its life; the stomach is a kind of dusthole, into which anything and everything finds ready admission. Its powers of digestion must be something wonderful; I believe clams could sup on copper tacks, and not suffer from nightmare. Spending the greater part of its time buried about two feet deep, the long syphon, reaching to the surface, discovers its whereabouts, as the ebbing tide leaves the mud, by continually squirting up small jets of water, about six or eight inches high. The sand flats dry, out marches an army of squaws (Indian women), as it is derogatory to the dignity of a man to dig clams. With only a small bit of skin or cedar-mat tied round the waist, the women tramp through the mud, a basket made from cedar-root in one hand, and in the other a bent stick about four feet long.

Thus armed, they begin to dig up the mud-homes of the unsuspecting clam: guided by the jets of water, they push down the bent stick, and experience has taught them to make sure of getting it well under the shell: placing a stone behind the stick, against which the squaw fixes her foot firmly, she lifts away: the clam comes from darkness into daylight ere he knows it, and thence into the Indian's basket. The

basket filled, the clam-pickers trudge back again to the lodge—and next to open him. He is not a *native* to be astonished with an oyster-knife; once having shut his mouth, no force, saving that of dashing his shell into atoms, will induce him to open it. But the wily redskin, if she does not know the old fable of the wind and the sun trying their respective powers on the traveller, at least adopts the same principle on the luckless clam; what knife and lever fail to do a genial warmth accomplishes. The same plan the sun adopted to make the traveller take off his coat (more persuasive, perhaps, than pleasant) the Indian squaw has recourse to in order to make the clam open his shell.

Hollowing out a ring in the ground, about eight inches deep, they fill the circle with large pebbles, made red-hot in the camp-fire near by, and on these heated stones put the bivalve martyr. The heat soon finds its way through the shelly armour, the powerful ropes that hold the doors together slacken, and, as his mansion gradually grows 'too hot to hold him,' the door opens a little for a taste of fresh air. Biding her chance, armed with a long, smooth, sharp-pointed stick, sits the squaw—dusky, grim, and dirty—anxiously watching the clam's movements.

The stronghold opens, and the clam drinks draught after draught of the cool life-giving air; then down upon him the savage pounces, and astonishes his heated and fevered imagination by thrusting, with all her force, the long sharp stick into the unguarded house: crash it goes through the quivering tissues; his chance is over! Jerked off the heated stones, pitilessly his house is forced open; ropes, hinges, fastenings crack like packthread, and the mollusc is ruthlessly dragged from his shelly home, naked and lifeless.

Having got the clam out, the next thing is to preserve it for winter: this is effectually accomplished by stringing-up and smoking. A long wooden needle, with an eye at the end, is threaded with cord made from native hemp; and on this the clams are strung like dried apples, and thoroughly smoked, in the interior of the lodge. A more effectual smoking-house could hardly be found. I can imagine nothing in the 'wide, wide world' half as filthy, loathsome, and disgusting as the interior of an Indian house. Every group has some eatable—fish, mollusc, bird, or animal—and what the men and squaws do not consume, is pitched to the dusky little savages, that, naked and dirty, are thick as ants in a hill; from these the residue descends to the

dogs, and what they leave some lower form of animal life manages to consume. Nothing eatable that is once brought in is ever by any chance swept, or carried, out again, and either becomes some other form of life, or, decomposing, assumes its elemental condition.

An old settler once told me a story, as we were hunting together, and I think I can vouch for the truth of what he related, of having seen a duck trapped by a clam:—‘ You see, sir, as I was a-cruising down these flats about sun-up, the tide jist at the nip, as it is now, I see a whole pile of shoveller ducks snabbling in the mud, and busy as dogfish in herring-time ; so I creeps down, and slap I lets ’em have it: six on ’em turned over, and off went the pack gallows-scared, and quacking like mad. Down I runs to pick up the dead uns, when I see an old mallard a-playing up all kinds o’ ’antics, jumping, backing, flapping, but fast by the head, as if he had his nose in a steel trap ; and when I comes up to him, blest if a large clam hadn’t hold of him, hard and fast, by the beak. The old mallard might a’ tried his darndest, but may I never bait a martin-trap again if that clam wouldn’t a’ held him agin any odds ’til the tide run in, and then he’d a’ been a gone shoveller

sure as shooting; so I cracked up the clam with the butt of my old gun, and bagged the mallard.

Any one who has travelled in America must have eaten clam-chowder, or, more probably perhaps, tried to eat it. It is a sort of intermediate affair between stew-proper and soup. How it is made I do not know, but I do know that to my palate it is the vilest concoction I ever tasted; and I always look upon a man who can eat clam-chowder with a kind of admiration almost akin to envy; for I feel and know that if he can eat chowder, short of cannibalism he can eat anything. I have tried smoked clam, but that I cannot say I enjoy; it is remarkably like chewing good old tarry ropeyarn, and, save the slight difference in nutritive power, about an equally agreeable repast.

If any of my readers should be curious to see the shells of these monster clams, they will find many I have recently brought home in the Shell Room of the British Museum.

MANSUCKERS.—The three kinds of cuttlefish best known in British seas are, first, the sepia, the creature whose backbone is the 'cuttlefish' of the apothecaries' shops; second, the 'loligo,' or 'calamary,' that has a beautiful penlike bone,

and, from the presence of a bag containing a black fluid, is sometimes called the 'pen-and-ink' fish; and third, the 'octopus.'

The octopus as seen on our coasts, although even here called a 'mansucker' by the fishermen, is a mere Tom Thumb, a tiny dwarf, as compared to the Brobdignagian proportions he attains in the snug bays and long inland canals along the east side of Vancouver Island, as well as on the mainland. These places afford lurking-dens, strongholds, and natural sea-nurseries, where the octopus grows to an enormous size, fattens, and wages war, with insatiable voracity, on all and everything it can catch. Safe from heavy breakers, it lives as in an aquarium of smooth lake-like water, that, save in the ebbing and flowing of the tide, knows no change or disturbance.

The ordinary resting-place of this hideous 'sea-beast' is under a large stone, or in the wide cleft of a rock, where an octopus can creep and squeeze itself with the flatness of a sand-dab, or the slipperiness of an eel. Its modes of locomotion are curious and varied: using the eight arms as paddles, and working them alternately, the central disc representing a boat, octopi row themselves along with an ease and celerity

comparable to the many-oared caique that glides over the tranquil waters of the Bosphorus; they can ramble at will over the sandy roadways intersecting their submarine parks, and, converting arms into legs, march on like a huge spider. *Gymnasts* of the highest order, they climb the slippery ledges, as flies walk up a window-pane; attaching the countless suckers that arm the terrible limbs to the face of the rocks, or to the wrack and seaweed, they go about, back downward, like marine sloths, or, clinging with one arm to the waving algæ, perform series of *trapèze* movements that Leôbard might view with envy.

The size, of course, varies. I have seen and *measured* the arm five feet long, and as large at the base where it joins the central disc as my wrist; and were an octopus by any chance to wind its sucker-dotted cable-arms round a luckless bather, fatal would be the embrace, and horrible to imagine, being dragged down and drowned by this eight-armed monster; a worse death than being crushed by coiling serpents like ill-fated Laocoon.

I have often when on the rocks, in Esquimaux Harbour, watched my friend's proceedings; the water being clear and still, it is just like peering

into an aquarium of huge proportions, crowded with endless varieties of curious sea-monsters; although grotesque and ugly to look at, yet all alike displaying the wondrous works of Creative wisdom. In all the cosy little nooks and corners of the harbour the great seawrack (*Macrocystis*) grows wildly, having a straight round stem that comes up from the bottom, often with a stalk three hundred feet long; reaching the surface, it spreads out two long tapering leaves that float upon the water: this sea-forest is the favourite hunting-ground of octopi.

I do not think, in its native element, an octopus often catches prey on the ground or on the rocks, but waits for them just as the spider does, only the octopus converts itself into a web, and a fearful web too. Fastening one arm to a stout stalk, stiffening out the other seven, one would hardly know it from the wrack amongst which it is concealed. Patiently he bides his time, until presently a shoal of fish come gaily on, threading their way through the sea-trees, joyously happy, and little dreaming that this lurking monster, so artfully concealed, is close at hand. Two or three of them rub against the arms: fatal touch! As though a powerful electric shock had passed through the

fish, and, suddenly knocked it senseless, so does the arm of the octopus paralyse its victim ; then, winding a great sucker-clad cable round the palsied fish—as an elephant winds its trunk round anything to be conveyed to the mouth—draws the dainty morsel to the centre of the disc, where the beaked mouth seizes, and soon sucks it in.

I am perfectly sure, from frequent observation, the octopus has the power of numbing its prey ; and the sucking-discs along each ray are more for the purposes of climbing and holding-on whilst fishing, than for capturing and detaining slippery prisoners. The suckers are very large, and arranged in triple rows along the under-surface of the ray, decreasing in size towards the point, and possessing wonderful powers of adhesion.

As illustrating the size of these suckers, I may as well confess to a blunder I once made. It was an extremely low tide, and I was far out on the rocks at Esquimalt Harbour, hunting the pools, when I saw what I fancied a huge actinia, as big as an eggcup, its tentacles hauled in, and, having detached its disc from the rocks, was waiting for the tide : placing the fancied prize safely in my collecting-box, to my disgust, on

examining my new species, it turned out to be only the sucking-disc of an octopus.

Tyrants though they be, an enemy hunts them with untiring pertinacity. The Indian looks upon the octopus as an alderman does on turtle, and devours it with equal gusto and relish, only the savage roasts the glutinous carcase instead of boiling it. His mode of catching octopi is crafty in the extreme, for redskin well knows, from past experience, that were the octopus once to get some of its huge arms over the side of the canoe, and at the same time a holdfast on the wrack, it could as easily haul it over as a child could upset a basket; but he takes care not to give a chance, and thus the Indian secures his prize.

Paddling the canoe close to the rocks, and quietly pushing aside the wrack, the savage peers through the crystal water, until his practised eye detects an octopus, with its great ropelike arms stiffened out, waiting patiently for food. His spear is twelve feet long, armed at the end with four pieces of hard wood, made harder by being baked and charred in the fire: these project about fourteen inches beyond the spear-haft, each piece having a barb on one side, and are arranged in a circle round the spear-end, and lashed firmly on with cedar-bark. Having spied out the

octopus, the hunter passes the spear carefully through the water until within an inch or so of the centre disc, and then sends it in as deep as he can plunge it. Writhing with pain and passion, the octopus coils its terrible arms round the haft; redskin, making the side of the canoe a fulcrum for his spear, keeps the struggling monster well off, and raises it to the surface of the water. He is dangerous now; if he could get a hold-fast on either savage or canoe, nothing short of chopping off the arms piecemeal would be of any avail.

But the wily redskin knows all this, and has taken care to have ready another spear unbarbed, long, straight, smooth, and very sharp, and with this he stabs the octopus where the arms join the central disc. I suppose the spear must break down the nervous ganglions supplying motive power, as the stabbed arms lose at once strength and tenacity; the suckers, that a moment before held on with a force ten men could not have overcome, relax, and the entire ray hangs like a dead snake, a limp, lifeless mass. And thus the Indian stabs and stabs, until the octopus, deprived of all power to do harm, is dragged into the canoe, a great, inert, quivering lump of brown-looking jelly.

CHAPTER VIII.

MULE-HUNTING EXPEDITION FROM VANCOUVER ISLAND TO SAN FRANCISCO—THE ALMADEN QUICKSILVER MINES—POISON-OAK AND ITS ANTIDOTE.

THE Commission, in 1860, were to commence the work of marking the boundary-line on the eastern side of the Cascades. A large addition to our staff of pack-mules being indispensable, I was despatched to San Francisco to purchase them; and instructed to rejoin the Commission, as soon as practicable, at the Dalles, already mentioned as a small town on the upper part of the Columbia river.

I introduce the journal of my mule-hunting adventures at this part of the volume, as it enables me to explain the systems of transport and travelling resorted to in wild countries, where roads and railways are unknown. I transcribe my journal, the events of each day as hastily recorded:—

Feb. 29th, 1860.—Left Esquimalt Harbour in

the steamer 'Panama,'—my destination San Francisco,—my mission to purchase mules. The island is still in its winter garb; not a bud has burst into leaf, and very few migratory birds have made their appearance. At 10.30 a.m. we are steaming out of the harbour; no wind, water smooth as a lake; run pleasantly down the Straits of Juan de Fuca, and pass Cape Flattery about 4 p.m. Wind blowing unpleasantly fresh, and a heavy tumbling swell makes the 'Panama' disagreeably lively. Passengers rapidly disappear; various gulping sounds, heavy sighs, and impatient calls for the steward, tell clearly enough that the most terrible leveller next to death, sea-sickness, has begun its work below.

March 1st.—A bleak misty morning, a heavy sea, wind dead ahead, and cold driving hail-showers. The ship, rolling from side to side, renders it difficult for even practised hands to guide anything spillable to the mouth; and walking, save to a sailor or a housefly, is an impossible performance.

March 2nd.—Managed to scramble on deck about 7 a.m., by going through a ~~series~~ of acrobatic performances, that came near to dislocating all my joints; wind moderated, but a heavy sea still rocked us very rudely. We are close in-

shore, passing Cape Blanco, 350 miles below Cape Flattery. Port Orford, a place celebrated for its cedar, is just visible through the haze; the rounded hills behind it are quite white with snow. Kept close inshore all day, but the weather is too cold, and sea too rough, for one to enjoy the scenery.

March 3rd.—Scrambled on deck again about 7 a.m.; wind still ahead, but altogether a better morning than yesterday. Had a good look at Cape Mendozena, a bold rocky headland, to the south of which is Mendozena city, consisting of a few houses and a groggery. The coast-line is exceedingly picturesque and pretty: between this headland and Point Arena a series of undulating hills, capped with massive pine-trees; their sides and grassy slopes, reaching down to the sea-line, remind me of English hayfields; it seems almost like enchantment, the change in the vegetation three days only from Vancouver Island.

March 4th.—At sunrise I am on deck, called by the captain, to get a peep at the 'Golden Gate.' There is just enough light to reveal a stupendous mass of bold mountain scenery, rising apparently from the sea, and towering up 3,000 feet and over, until lost in the haze of the morning.

Under the shadow of these hills we are puffing towards an opening, as if cut purposely through a solid wall of rock. On the right stands an immense fortress, built of red brick. Alcatraz Island, right ahead, is dimly visible, like a grey spot in the line of water. The ripple, touched by the sunbeams that are slanting into the bay, seems converted into revolving cylinders of brilliants. As we steam through this magnificent portal, the finest harbour in the world opens out to the southward and westward. On the curving shore of the bay, I can see the city of San Francisco, built on the slopes of three hills; to the left the island of Yerba Buena; farther to the right a forest of masts, from which flags representing every nation flutter in the breeze; ahead a long stretch of water, as far as eye could follow it—the continuation of the harbour.

We ran alongside an immense pier at 6 a.m. I am mobbed by touters from every hotel in San Francisco, and have hard work to keep my luggage from being equally divided amongst them. Passengers appear, for the first time since leaving Vancouver Island, blanched like celery or seakale. By dint of strong arms and stronger language, I get my luggage fastened to a grating that lets down by machinery, at the end of an

omnibus marked 'Oriental Hotel.' I am hustled into the 'bus with three pale passengers, and we are rapidly whirled off to the 'Oriental.' The mail-packet from Panama has also just arrived; all the beds are taken at the hotel, so I bide my chance of some one leaving before night.

Called on the Consul, and through his kindness am located in the Union Club House, a grand improvement on the 'Oriental.'

March 5th.—Occupied in giving my letters of introduction, and arranging money-matters. The club-house in which I am staying is a massive granite building. The granite, beautifully faced and fitted, was all hewn in China; the house was put together there, to see everything was properly finished, then taken to pieces, packed, and shipped for San Francisco. Chinese builders came with it, brought their own scaffolding (made entirely from bamboo), put it together, built up the granite edifice in which I transcribe this, as handsome a structure as any San Francisco can boast of.

March 6th.—Having nothing particular to do, determine to visit the New Almaden quicksilver mines. There are two routes to these mines—one per stage the whole distance (56 miles), the other per steamer to the head of the Bay of San

Francisco, and thence by stage to San José. Past experience had taught me, whenever possible, scrupulously to avoid stage travelling. Being tossed in a blanket, or rolled down a steep hill in a cask, produce much the same bruised and general state of sprain and dislocation as a day's ride in a stage. Choosing the steamer lessened the chance of jolting by quite one-half, at the same time affording a good opportunity of seeing the famed Bay of San Francisco.

I embark at seven from a wooden pier—early as it is, alive with the hum, buzz, and bustle of the awakening city—and steam away over the unrippled waters of the bay. The temperature is delicious; a few fleecy clouds are swept rapidly over the clear blue sky by a light breeze blowing softly from the land, laden with the perfume of wild flowers and forest trees. A run of a few hours brought us to the embarcadero, or landing, at the head of the bay, from whence a stage bumped me over the road about four miles, to the old town of San José.

Pueblo San José stands at the entrance of a lovely valley. The town consists of a collection of adobe houses; a few in the main street are built of wood, painted white, with brilliant green jalousies outside the windows. The older houses

are scattered round an open space, the plaza: trees of greenest foliage, in double rows, shade one from the burning sun, and everywhere spacious orchards and flower-gardens testify to the fertility of the soil.

Having a note from a friend in San Francisco to the host of '—— House,' more than ordinary civility was accorded me, and by some superhuman means a buggy would be ready in about two hours to take me to the mines. Crossing the Alameda, a grove of willows and oaks, planted by the padres, leads to the old crumbling walls of what was once a very spacious mission, now rapidly falling to decay. The interior of the old church is decorated with rude carvings, paintings of the Crucifixion, and frescoed figures of saints and martyrs, clad in garments of dazzling colours. One old shaven priest, with a particularly dirty cassock, and a face so begrimed with layers of filth as to be mosquito-proof, was the only ecclesiastic visible. Thousands of cliff swallows (*Hirundo lunifrons*) were busy building their bottle-shaped mud nests under the dilapidated roof.

Discovered little worth looking at in the town. Found the buggy waiting: my coachman, a regular Yankee, puffing vigorously at an im-

mense cigar, was sented in readiness, his legs resting on the splash-board. Without removing the cigar from his mouth, he drawled out, 'Say, Cap'en, guess you'd better hurry up if you mean making the ranch before sundown. Bet your pants this child ain't agwine that road in the dark nohow.' 'What's to happen?' I mildly enquired. 'Happen! Wal, maybe upset; maybe chewed up by a grisly; maybe cleaned slick out by the greasers. You'd better believe a man has to keep his eye skinned in the daytime; so hurry up, Cap.' Without further parley I scrambled in, and away we went.

Our road lay over broad plains and through occasional belts of timber; deep, gravelly arroyos, in and out of which we dashed with a plunging scramble, marked the course of the floods. Everything was steaming hot; the baked ground reflected back the scorching sun-rays, until the atmosphere quivered as one sees it over a limekiln; the mustangs in a fog of perspiration; the Jehu, denuded of coat and vest, continually yelled 'A git along,' with a rein in each hand, steering rather than driving, was red-hot in body and temper. But this was nothing to my state of broil. Exposed to a temperature that would have made one perspire sitting in the

shade; to be kept in a state of bodily fear of instant upset; to undergo a continuous exercise that would have been good training for an athlete, to avoid being shot out of the buggy like a shell from a mortar, would have set an Ice-lander in a glow. The rapidity with which we whirled along, and the eccentric performances of the vehicle, destroyed, in a measure, the enjoyment of a scene quite new to me.

We rattled through the splendid valley of Santa Clara, passing here and there a fertile ranch; on either side, the wooded slopes looked like lawns of Nature's own contriving; far on my left, the bay glimmered like a line of silver light, the ground carpeted with flowers, brilliant escholtzia and blue nemophila were most conspicuous amidst a natural harvest of wild oats and grass; and on all sides, from amongst the clumps of buck-eye and oak, the cheery whistle and chirp of birds rang pleasantly on the ear.

Reaching the 'Halfway House' (as a small wooden building is named, midway betwixt San José and the mine), we stopped to water the mustangs and refresh the inward man—a respite most acceptable. A 'tall drink' worked wonders on my hitherto taciturn coachman, who, as we jogged along the remaining half the journey,

related such wonderful stories, that it seemed to me we had hardly left the 'Halfway House' ere we rattled under a grove of trees completely shutting out the fading light, and pulled up with a sudden jerk, that well-nigh pitched me over the mustangs. 'Guess we've made it, Cap'en; this here's the manager's.'

Giving my letters of introduction to Mr. Young, a hospitable invitation to be his guest was readily accepted. I cannot help devoting a line to the praise of a house most enjoyable in its minutest details, with a host and hostess it refreshes one's heart to recall to memory.

The lower village of Almaden consists of a long row of very pretty cottages, the residences of the workmen employed in smelting the ore; each cottage was completely buried with honeysuckle and creeping roses; the gardens in front filled with flowers, and at the back with vegetables and fruit. A small stream of water, clear and cold, ripples past the frontage, brought from a mountain-burn that runs swiftly at the back, a barrier dividing the gardens from the surrounding hills. An avenue of trees leads from the cottages to the spacious brick buildings used for smelting.

The discovery of these fabulously rich mines of

quicksilver is briefly told. Long ere gold was discovered in California, the padres and early settlers knew of a cavern in the hillside, about a mile and a half from the present village. Deeming it merely a natural fissure or cleft in the rock, explorations only were made by the more adventurous as to its extent, which proved to be in length one hundred feet, running into the mountain horizontally. No one ever thought it was an artificial excavation of great antiquity. When the vaqueros and old dons of the neighbourhood were questioned by a new-comer about the cave, a shrug of the shoulders, and the usual reply, 'Quien sabe? son cosas muy antiguas,' was the sole information obtained.

A gold-seeker, assaying some of the rock, salivated himself, and thus discovered it was rich in quicksilver. A grant, with the land adjoining, was procured, and the original opening widened; in clearing away the rubble and dirt at the end of the cave, several skeletons were discovered, together with rude mining-tools and other curious relics, clearly proving it an old excavation made by the natives for the purpose of procuring vermilion, so much used by all savages to paint themselves. The position of the skeletons in the rubbish covering them left no doubt that, having

followed the vein of cinnabar, without exercising due precaution to prop the loose ground overhead, they had been literally buried alive in a grave of their own digging. Further research soon revealed the immense value of the deposit. Many years rolled away, and very little was done until it passed from the hands of an English company into that of an American firm.

The mine is about a mile and a half from the smelting-works, on the side of a mountain; an admirable road leads to it by a gentle ascent, down which waggons drawn by mules bring the ore to be smelted. On reaching the summit I rested on a level plateau, on which the upper works are built; I am to descend presently into the depths of the mine to see how the ore is deposited, and trace, step by step, the various processes it has to go through before it is marketable.

The main entrance is a tunnel ten feet high, and about an equal width throughout, in which runs a tramway leading to the shaft. At the end of this tunnel a small steam-engine does the work of the poor 'tanateros,' or carriers, who, until very recently, brought the ore and rubbish from the bottom of the mine on their backs, a system still adopted in Spain and Peru, each man

having to bring up a load of two hundred pounds, in a bag made of hide, fastened by two straps passing round the shoulders, and a broader one across the forehead, which mainly sustains the load. It was fatal work to the poor Mexicans who had to do it, the terrible muscular strain soon producing disease and death!

On reaching the engine I am undressed and rigged as a miner, a costume far more loose and easy than becoming. Three dip-candles dangled from a button on my jacket by the wicks, and one enveloped in a knob of clay for my hand, completed my toilet. The next process is to be lowered down into the mine. Squeezing myself into a huge kind of bucket, and assuming as near as practicable the shape and position of a frog, my candle lighted, 'All right!' says somebody, and I find myself rapidly descending a damp dismal hole, dripping with water like a shower. Of course I shudder, and have horrible ideas of an abyss, ending no one knows where; the candle hissed, sputtered, and went out; the bucket swang as the chain lengthened, and bumped unpleasantly against the rocks; now a sudden stop, and a lively consciousness of being dragged bodily out like a bundle of clothes, discloses the fact of my safe arrival at the bottom.

The swarthy Mexican miner deputed as guide leads the way along a narrow gulley, and down an incline to the mouth of another hole, the descent to which has to be effected on a slanting pole, with notches cut in it, very like a bear-pole, called by the miner an *escalera*, requiring a saltatory performance that would not have been so bad if I had only known where I should have landed in case of falling. After this we scramble down a flight of steps cut in the rock, and reach the lowest excavation, about one thousand feet from the surface.

The cinnabar is found in large pockets, or in veins, permeating a kind of trap-rock; and as the miners dig it out, large columns or pillars are left to support the roof, and prevent the chance of its falling in. A small charcoal-fire burned slowly at the base of one of these massive columns, and as its flickering light fell dimly, illuminating with a ruddy glow the bronzed faces and nearly nude figures of the miners, the vermilion hue of the rugged walls and arched roof, sparkling with glittering crystals, forcibly reminded me of a brigand's cave, such as Salvator Rosa loved to paint.

All the work is done by contract: each gang taking a piece of ground on speculation, is

paid according to the amount of ore produced ; the ore averaging about thirty-six per cent. for quicksilver, although some pieces that I dug myself produced seventy-five per cent. Many mines in Europe have been profitably worked when the cinnabar has yielded only one per cent.

A shrill whistle rings through the mine ; the miners from all directions rush towards the pillars. Thinking, at least, the entire concern was tumbling in, I was about to scamper off, when the guide, seizing my arm, drags me behind a projecting mass of rock, simply saying, 'A blast!' For a while there was a deathlike silence—not a sound save the hiss of the fusee, and the heavy breathing of the men ; then the cave lighted up with a lurid flash, shedding a blinding glare over every object like tropical lightning. The dark galleries appeared and disappeared in the twinkling of an eye, whilst the report, like countless cannon, was echoed and reechoed through the cavernous chamber. Showers of fragments came rattling down in every direction, hurled up by the force of the powder. On the smoke clearing, the miners set to work to collect the scattered fragments of cinnabar. If a blast has been successful, often many tons of rock are loosened and

torn out, to be broken into small pieces and conveyed to the bucket, and hauled by the engine to the surface. The mining operations are continued night and day, seventy-four pounds of candles being consumed every twenty-four hours.

I finish the survey of this singular mine perfectly free from foul air or fire-damp; ascend as I came down; and, by vigorous rubbing with soap-and-water, am slowly restored from bright vermilion to my normal colour.

The ore, on reaching the surface, is conveyed by the tram-cart to the sorting-shed, where it is broken and carefully picked over by skilful hands, great caution being needed in selection, as much valuable ore might be thrown away, or a large quantity of useless rock taken to the smelting-furnaces. The picked ore is placed in large bags made of sheepskin, weighed; and then hauled by the mules to the lower works.

Near the mine is a primitive kind of village, the abode of the miners, sorters, and ore-carriers, who are principally Mexicans; dirty señoras in ragged finery, dirtier children devoid of garments, together with dogs, pigs, poultry, and idle miners playing monte on the doorsteps, contrast sadly with the exquisite little village at the works.

Descending from the mine to the level ground by a short track down the hillside, through scenery indescribably picturesque, I reach the smelting furnaces; these, occupying about four acres of land, are built of brick, admirably neat, and well contrived. As quicksilver is found in several forms—namely, native quicksilver, occurring in small drops, in the pores or on the ledges of other rocks, argental mercury, a native silver amalgam, and sulphide of mercury or cinnabar, different processes are requisite for its reduction. Here it is found solely in form of cinnabar, and to reduce it a kind of reverberatory furnace is used, three feet by five, placed at the end of a series of chambers, each chamber seven feet long, four wide, and five high. About ten of these chambers are arranged in a line, built of brick, plastered inside, and secured by transverse rods of iron, fitted at the ends with screws and nuts, to allow for expansion. The top is of boiler iron, securely luted.

The first chamber is the furnace for fire, the second for ore, separated from the first by a grated partition, allowing the flame to pass through and play over the cinnabar. This ore-chamber, when filled, contains ten thousand pounds of cinnabar. The remaining chambers

are for condensing the metal, communicating by square holes at the opposite corners; for instance, the right upper corner and lower left, and *vice versa*, so that the vapour has to perform a spiral course in its transit through the condensers. Leaving the chambers, the vapour is conducted through a large wooden cistern, into which a shower of water continually falls, and thence through a long flue and tall chimney carried far away up the hillside.

The mercury is collected, as condensed, in gutters running into a long conduit outside the building, from which it drops into an iron pot sunk in the earth. As the pot fills, the mercury is conveyed to a store-tank that holds twenty tons. So great is its density, that a man sitting on a flat board floats about in the tank on a lake of mercury without its flowing over the edges of his raft. From this tank the metal is ladled out, and poured into iron flasks containing each seventy pounds (these flasks are made in England, and sent to New Almaden): in this state it is shipped for the various markets.

Although every possible care has been taken to prevent the mercurial fumes from injuring the smelters, still a great deal of it is necessarily inhaled, most injurious to health. Clearing out

the furnace is the most hurtful process, the men employed working short spells, and resting a day or two between. A furnace charged with ore, I am told, takes about eight days to sublime and cool.

It is difficult to obtain a correct statement of the absolute yield of this mine; proprietors, for many reasons, deeming it inexpedient to let the world know the extent of their riches. The export of quicksilver from San Francisco, a few years back, may, I think, be averaged at 1,350,000 pounds of mercury per annum, valued at 683,189 dollars; and this, together with the large amount consumed in California, was the sole produce of the New Almaden mines.

There are fourteen furnaces, arranged with passages ten feet wide between them, the whole covered with a roof sufficiently high to allow a current of air to circulate freely. Between the furnaces and on all the open spaces are innumerable bricks, just as we see them in a brickyard to harden before baking. On inquiring what these were made for, I discover that all the fragments and dust-cinnabar are pounded together, mixed with water, and made into bricks: in this form the ore can be conveniently built into the furnace, securing intervening spaces for the

flame and heat to act on; thus more perfect sublimation is secured, and a great saving of metal effected. There are blacksmiths' and carpenters' shops and a sawmill adjoining the furnaces.

Until recently all the ore was brought down from the mine packed on the backs of mules, a most costly system of transport as compared to the one now in use. The vegetation only suffers immediately round the chimney, and even there not to any alarming degree. The flue, being of great length, carried at a moderate slope up the hill, and terminating in a very tall chimney, completely condenses all mercurial and arsenical fumes. Before this flue and stack were constructed, even the mules and cattle grazing in the pastures died from the poisonous effects of the mercurial vapour; and its deadly action on vegetation was like that of the fabled upas-tree. The workmen now, as a rule, enjoy very good health, and are admirably cared for; the village boasts a capital hotel, and stages run daily to San José and San Francisco.

A spring of native soda-water, bubbling up in the centre of the village, protected and fitted like a drinking-fountain, is said to work wonders as a curative agent in all maladies arising from the effects of mercury. This spring is sup-

posed to be under the especial care of a 'Saint Somebody,' a lady whose image, attired in very dirty finery, figures in niches cut in the rocks at the mine. No miner ever leaves or enters the mine without prostrating himself before this dirty effigy.

March 9th.—Return to San Francisco by road; dine at San Mateo, as lovely a spot as I ever gazed on. The grass is kneedeep, and the clumps of buck-eye (*Esculus flava*) and handsome oaks besprinkling the rounded hills and banks of the clear stream winding its way past the village to the Bay of San Francisco, like a lake glistening in the distance, reminded me of a park in fertile Devonshire. Completely shut in, and sheltered from the wind that blows nearly all the summer, withering up the vegetation exposed to its influence, everything round about this favoured spot grows in wild luxuriance. In the garden belonging to the roadside house, the summer flowers are in full bloom, and vegetables of all kinds in rare abundance, such as for size and quality equal anything Covent Garden Market can show.

The bay runs inland about forty miles, and the land on its shores is particularly fertile, and employed in great measure for dairy-farms and stock-ranches.

For the first time I gather the poison-oak (*Rhus toxicodendron*), a pretty plant, that climbs by rootlets, like the ivy, and trails gracefully over both rocks and trees. Some persons are most seriously affected by it, especially such as are of fair complexion, if they only venture near where it grows. It produces swelling about the eyes, dizziness, and fever; the poisonous effects are most virulent when the plant is bursting into leaf. I picked, examined, and walked amidst the trees over which it twined thickly, but experienced not the slightest symptoms of inconvenience. Still, I know others that suffer whenever they come near it. Where the poison-oak thrives, there too grows a tuber known to the settlers as Bouncing Bet, to the botanist as *Saponaria officinalis*, the common soapwort. The tuber is filled with a mucilaginous juice which, having the property of entangling air when whisked up, makes a lather like soap. This lather is said to be an unfailing specific against the effects of the poison-oak—the poison and its antidote growing side by side!

CHAPTER IX.

SACRAMENTO — STOCKTON — CALIFORNIAN GROUND-SQUIRRELS —
GRASS VALLEY — STAGE TRAVELLING — HYDRAULIC WASHINGS —
NEVADA — MARYSVILLE — UP THE SACRAMENTO RIVER TO RED
BLUFFS — A DANGEROUS BATH.

March 10th.—At San Francisco this morning a friend took me to see the 'What Cheer House,' a very large hotel, supported by gold-miners, where they make up six hundred beds, every lodger having a small room to himself, with marble wash-stand, looking-glass, and dressing-table. Each story shuts off from the next by fireproof doors, and the water is forced to the top of the house, where there are hoses, fire-buckets, and axes enough to fit out a fire-brigade. A large steam-engine is the cook's assistant, doing everything that hands usually do; it kneads the bread, rolls the dough, drives the roasting gear, grinds coffee, peels apples and potatoes, beats the eggs (twelve hundred dozen a week), washes, irons, dries, and mangles the clothes; heats the water for the bathing-houses, which are perfect

in every detail; does all the pumping, and cleans the knives.

Adjoining the dining-room is a well-selected library, general reading-room, and museum, containing a capital collection of stuffed birds, and other useful objects of Natural History. The rate each miner pays is five dollars, equal to 1*l.* per week: this includes eating and drinking. The house is strictly a temperance one, no fermented liquor being allowed within it.

Wandering about San Francisco would be much more enjoyable, if the hills were less steep, and the wind, which is everlastingly blowing, freighted with fine sand, that finds its way into your very watchcase, could be stilled.

March 11th.—Steaming across the bay in a white steamer called the 'Eclipse,' propelled by the largest paddlewheels I ever saw. We are en route to Sacramento, which we reach late at night.

March 12th.—Strolled about. Hardly believe so vast a place can have grown up in ten years. I think I like it better than San Francisco. The streets running east and west are marked by numbers—1*st* street, 2*nd* street, and so on; those having a north and south bearing by letter, as—A street, B street, &c. Received a telegram from the Commissioner, who had just reached

San Francisco on his return from England, to join him.

Nothing material occurs in my journal until

March 23rd.—I am at the Webber House in Stockton, a very pretty city, built on what the Americans call a *slew*, or, in other words, a muddy arm of the San Joaquin river. The country round is perfectly flat, but fertile beyond description. To obtain water the inhabitants have only to bore an augur-hole about nine feet in depth, when it bubbles up like a fountain. In nearly every garden is a tiny windmill, employed to irrigate the peach-orchards and general crops. Hear of 700 mules that have just arrived from Salt Lake city.

March 24th.—Drive out in a buggy to the mule ranch. The country very bare of timber, but thickly covered with grass. Every hillock, I observe, is burrowed like a rabbit-warren by the Californian ground-squirrel (*Spermophilus Beechyii*). I am told that it is next to impossible to drive out or exterminate these most destructive pests; entire fields of young wheat are cleared off by them, as if mowed down; gardens are invaded, and a year's labour and gain destroyed in a single day. Trapping, shooting, and strychnine have failed to accomplish the work of extinction. Farmers often flood entire districts,

'to drown out the darned cusses!' Their habits are strictly diurnal; and pretty lively little fellows they are, scampering off to their holes on the approach of danger, where they sit up on their hind-legs, peering curiously at the intruder. You may come very near now: there is a safe retreat behind, and he knows it. When too close, however, for safety's sake, the squirrel gives a shrill defiant whistle, like the laugh of a sprite, and dashes into its burrow.

- Purchased twenty-one mules, at 150 dollars per head; the others were team-mules, and too large for pack animals. My mules are to remain on the ranch until I have completed my other purchases.

March 25th.—Cross in the stage from Stockton to Sacramento, a distance of about forty miles, through a country fertile in the extreme. Wild flowers, in endless variety of colour, decked the grass-land. The hawthorn, white with blossom, perfumes the air; and the waving green cornfields contrast pleasantly with the foliage of the oaks and chestnuts scattered about in graceful clumps. We change horses at Woodbridge, Fugit Ranch, and Elk Grove, and at four o'clock pull up at the St. George's Hotel, Sacramento.

March 26th.—I am again on the road, this time bound to Grass Valley. A clumsy railway with cars, or carriages, like the yellow caravans giants, dwarfs, and wise pigs travel in, bumps me out to Fulsome, about thirty miles off. Here I am hustled into a stage, without a chance of seeing anything but mud, in which the horses are standing knee-deep.

This stage is different from any I have seen, loops, straps, and other contrivances, clearly meant to hold on by, evidence an inequality of motion and tendency to upset that give rise to disagreeable forebodings. Constructed to hold nine inside, the centre seat swings like a *bale* dividing horses in a stable, and being somewhat rounded and padded, looks very like it. Five passengers seat themselves. I have hardly time to look at them, when a loud cracking of whips, several voices yelling 'Hi! git up!' 'Hi! git along!' and a sudden jerk sends me upon the *bale*—a general splash and scramble—and we are off!

We do the first ten miles with a bearable amount of jolting, and stop to change horses. The five insiders get out, and we take a nip at the roadside house, or what would be such if there were any roads. I observe four most perverse, obstinate, wild-looking horses being cautiously

fastened to the stage; they are clearly uneducated—'wild mustangs' one of the insiders called them. They are held tightly. 'All aboard, boys?' says the driver (they call him *Mose*)—in we scramble—bang slams the door—and with an awful lurch away we go! Now I can understand the suspicious-looking machinery, designed, on the principle of life-buoys, for stage-tossed travellers to cling to. Holding on to these we swing along as hard as the beasts can gallop.

I am told by a fellow-passenger that unless the 'mustangs start at a gallop, they either upset the stage, or kick themselves clear of the harness.' On this journey they were agreeable enough to gallop off, so we escaped the two contingencies. Several times *Mose* shouted, 'Get out, boys, and hang on awhile.' I discover that this means that we are to cling to the side of the stage, that our united weight may prevent its capsizing, when going along the side of a slope like the slant of a housetop.

Near dark we are requested by 'Mose' to walk up the last hill. A tall sallow man, with a face hollow and sunken, closely shaven, except a tuft at the chin, steps along with me, and we reach the top of the hill a good time before the stage. We are standing amidst some scrubby timber.

The long shadows of the trees are swallowed up in the gathering gloom, the music of the forest has died away, and, save the wind sighing through the leafy foliage, everything is still. My companion draws nearer. 'Stranger,' he began, in a voice that appeared to come from his boots, and get out at his nose, 'jist war we are standin', three weeks agone, a tarnation big grizzly come slick upon two men, jist waitin' for the stage, as we are; chawed up one, and would a gone in for t'other, but he made tall travellin' for the stage. When they came up Ephraim had skedaddled, and they never see him or old Buck-eye arter.'

This is refreshing! I hope if 'old Ephraim' does come, he may eat my tough companion. The stage came, but the bear did not. We reach our destination at 8 p.m.: how sore I am!

March 27th.—A good sleep has worked wonders. I find Grass Valley a romantic little mountain town, about 2,200 feet above the sea-level, on the western slope of the Sierra Nevada, owing its existence entirely to 'gold-mining. Visited Mr. A.'s mill—a magnificent quartz-crusher. Nine stamp-heads, each 900 lbs. in weight, are worked by one of Watts' engines. The fine-dust gold is collected on blankets, or bullocks' hides with the hair on, over which the

water washes it, as it comes from the stamp-heads. Some of the most productive gold deposits in California were discovered in and about this quaint little place. I descend a shaft 240 feet deep. The gold is distributed through the mud and silt of what was clearly an ancient river-bed.

March 28th.—Ride on horseback to Nevada and Hunt's Hill. Nevada is a clean pretty city, with gay shops, brightly-painted houses, and planked streets. Near it are the famed hydraulic washings. The gold is disseminated through terraces of shingle conglomerates, often three hundred feet in thickness. These terraces are actually washed entirely off the face of the country, by propelling jets of water against them, forced under great pressure through a nozzle. To accomplish this, the water is brought in canals, tunnels, and wooden aqueducts, often forty miles away from the drift. This supply of water the miners rent.

As we near the washing-spot, in every direction immense hose, made of galvanized iron, and canvas tubes six feet round, coil in all directions over the ground, like gigantic serpents, converging towards a gap, where they disappear. On reaching this gap, I look down into a basin, or dry

lake, 300 feet below me. The hose hangs down this cliff of shingle, and following its course by a zigzag path, I reach a plateau of rock, from which the shingle has already been washed. A man stands at the end of each hose, that has for its head a brass nozzle. With the force of cannon-shot water issues, in a large jet, from this tube ; and propelled against the shingle, guided by the men, washes it away, as easily as we could broom a molehill from off the grass.

The stream of water, bearing with it the materials washed from out the cliff, runs through wooden troughs called 'flumes,' floored with granite; these flumes extend six miles. Men are stationed at regular distances to fork out the heavy stones. Throughout its entire length transverse strips of wood dam back a tiny pond of mercury; these are called *riffles*—gold-traps, in other words—that seize on the fine-dust gold distributed throughout the shingle. The 'flumes' are cleaned about once a month, and the gold extracted from the mercury. Masses of wood occur, in every stage of change, from that of pure silica to soft asbestiform material, and pure carbon.

I am strongly disposed to think this immense hollow must have been the rocky shore of an

inlet or a lagoon; the rocks underlying the shingle have all the appearance, when denuded by the washing, of sea-wear. I try with a powerful lens to detect gold amidst the material they are washing, but not a trace is discoverable, and yet it pays an immense profit to the gold-washers.

Hunt's Hill is a timbered mountain, about 3,500 feet in altitude. Washing its base is the Greenhorn river, on the banks of which some very rich gold-washings are carried on, as well as at Bear Creek, on the opposite slope of the ridge. Clothing the hill, towering high above the shanties of the miners, the sugar and nut-pines wave lazily; the immense cones of the latter, plentifully besprinkling the ground, afford a feast to the Indians and lesser rodent mammals.

March 29th.—Return to Marysville. Visited another hydraulic washing at Timbuctoo, on the Yuba river, much the same as that seen at Nevada. Marysville is about the third best city in California, situated on the bank of the Feather river, which is rapidly filling up, from the immense quantity of material brought down from the hydraulic washings. A single peach-orchard I visited was 200 acres, all fenced, and the trees in beautiful health; from it, I am told,

80,000 dollars were returned in a single year by the sale of the peaches.

I commence my journal again on

April 24th.—I am in the 'Victor' steamboat, a small crank flat-bottomed affair, pushed against the current by a huge stern-wheel—an ugly appendage, but very effective in navigating swift shallow streams. I am bound for Red Bluffs, 275 miles above Sacramento. Pass the exits of the Yuba and Feather rivers, and change the yellow muddy water for the pure sparkling stream fresh from the mountain.

April 25th.—Starting again—the 'Victor' having been fastened up all night, tethered to a tree, as one would tie up his horse—the scenery, as we wend along the sinuous course of the stream, rapidly changes its character. The banks get steep, and sharp hills take the place of the flat lands behind us. Wild grape-vines hang in clustering tangles of green luxuriance from the branches of the ilex, oak, and arbutus, forming a continuous arcade over the water.

The Bluffs are reached. A straggling town, built on a high bank beetling over the Sacramento river, peeps out, from amidst some tall trees. Men, women, children, and dogs are crowding

down, marching like ants from a hill towards a recent discovery of eatables. The banks are red, the soil is red, and the houses are built of red brick—Red Bluffs, a proper and appropriate name.

Land, and put up at —— House, not remarkable for anything but dirt and discomfort.

April 26th.—Purchase 59 mules, with a complete pack and equipment. My mules and men, that I had sent by land from Stockton, arrive. Hire two additional hands, and order the provisioning for my intended trip.

April 27th.—Mules and men need rest; breakfast over.

‘Now, Cap’en,’ says mine host, as I was debating whether it would be wiser to remain quietly at home, and enjoy a thoroughly idle day, or join the hunters, ‘I calkilate we’ve got to worry out this day somehow. S’pose we take a ride over to the Tuscan Springs. It’s a mighty strange place, you bet your life; they say it’s right over the devil’s kitchen, and when he’s tarnation hot, he comes up and pops out his head to get a taste of fresh air. The very water comes risin’ up a-bilin’, and the pools flash into flame like powder, if you put fire near ’um.’

‘Why, Major,’ I replied, ‘it is the place of all others I should enjoy seeing. How far is it?’

‘Waal, it ain’t over ten mile, but a mighty bad road at that.—Here, Joe, saddle up, and bring round two mustangs.’

The mustangs are small compact horses, seldom exceeding fourteen-and-a-half hands in height, descended from Spanish stock, originally brought into Mexico on its conquest by the Spaniards. They run wild in large herds on the grassy prairies in California and Texas, and are just lassoed when needed. I may perhaps mention, *en passant*, that a lasso is from thirty to forty feet long, and made of strips of raw hide plaited together. When a mustang is to be caught, an experienced hand always keeps the herd to windward of him; sufficiently near he circles the lasso round his head, and with unerring certainty flings it over the neck of the horse he has selected.

The end of a lasso being made fast to a ring in the saddle, as soon as the horse is captured, the rider turns his steed sharp round, and gallops off, dragging the terrified and choking animal after him. The terrible noose becomes tighter and tighter, pressing on the windpipe, until, unable to offer further resistance, the panic-stricken beast rolls in agony, half suffocated, on the prairie. Never after this does the horse forget the lasso—the sight of it makes him tremble in every limb.

I have seen the most wild and vicious horses rendered gentle and docile in a minute, by simply laying the lasso on the neck behind the ears.

The breaking-in is a very simple affair: while the animal is down the eyes are bandaged, and a powerful Spanish bit placed in the mouth. This accomplished, he is allowed to get up, and the saddle is firmly 'synched.' The saddles commonly used in California differs very little from those used in Mexico. The stirrups are cut out from a block of wood, allowing only the point of the toe to be inserted; they are set far back, and oblige the rider to stand rather than sit in the saddle. One girth only is used, styled a 'synch,' made of horsehair, and extremely wide; no buckles or stitching is used, but all is fastened with strips of raw hide. Everything being complete, the rider fixes himself firmly in the saddle, and leaning forward jerks off the blind; it is now an open question who is to have the best of it. If the man succeeds in sitting on the mustang until he can spur him into a gallop, his wildness is soon taken out of him, and one or two more lessons complete the breaking.

Joe by this time had made his appearance with the mustangs. Mounting, away we went at a raking gallop!

I know no exercise half as exhilarating and exciting as the 'lope,' a kind of long canter, the travelling pace of a mustang; there is no jarring or jolting. All one has to do is to sit firmly in the saddle; the horse, obeying the slightest turn of the wrist or check of the rein, swings along for hours at a stretch, without any show of weariness.

Having crossed the Sacramento in a 'scow,' a kind of rough ferry-boat, our road lay over broad plains and through scattered belts of timber. The grass was completely burnt up, and the series of gravelly arroyos, in and out of which we continually plunged and scrambled, marked clearly the course of the winter streams.

The air felt hot and sultry, but fragrant with the perfume of the mountain cudweed. Not a cloud was visible in the lurid sky, and the distant mountains, thinly dotted with timber, seemed softened and subdued as seen through the blue haze. We entered a valley leading through a pile of volcanic hills that one could easily have imagined had been once the habitat of civilised man. The wooded glades had all the appearance of lawns and parks planted with exquisite taste; the trees, in nothing resembling the wild growth of the forest, were grouped in every variety of graceful outline.

On either side the hills were covered with wild oat as thick as it could grow; its golden-yellow tints, contrasting with the dark glossy-green of the cypress, the oak, and the manzanata, had an indescribably charming effect. As we advanced the valley gradually narrowed, until it became a mere *cañon* (the Spanish for funnel), shut in by vast masses of rock that looked like heaps of slag and cinder—bare, black, and treeless. A small stream of bitter, dark, intensely salt water trickled slowly through the gorge.

Following a rough kind of road, that led up the base of the hills for about two miles, we entered what I imagine was the crater of an extinct volcano; nearly circular, about a mile in diameter, and shut in on every side by columnar walls of basalt. There was a weird desolation about the place that forcibly reminded me of the Wolf's Glen in *Der Freischütz*—a fit haunt for *Zamiel*! Scarce a trace of forest-life was to be seen, not a tree or flower; everything looked scorched and cinderous, like the *débris* of a terrible fire, and smelt like a limekiln on a summer-night. A long narrow house, resembling a cattle-shed, stood in the centre of this circle.

‘Waal, Cap'en, I guess we've made the ranch anyhow,’ said the Major, as we drew up at the

door of this most uninviting-looking establishment. 'A mighty tall smell of brimstone,' he further added, 'seems coming up from "Old Hoof's" stove-pipe. Calkilate he's doing a tallish kind of dinner below.'

I had no time to reply, ere the host, owner, and general manager of the Tuscan Springs made his appearance. 'How's your health, Doctor?' inquired the Major. 'I've brought up Cap'en — to have a peep at your location; he's mighty curious about these kind of diggins.'

'Waal, Cap'en,' said the Doctor, in a long drawling voice, 'I am glad to see you. I raither guess you don't see such nat'ral ready-made places, for curin' jist every sickness, in the old country as we have in California.—Here, boy, put up the mustangs: and now step in, and I'll tell old aunty to scramble up some eggs and bacon, and then we can take a look round the springs.'

Aunty was a quaint specimen of the feminine gender, not at all suggestive of the gentler sex. Her features were small, but sharply cut. She was bent naturally, but not from age, and reminded me of a witch. One would not have felt at all astonished at seeing her mount a broomstick, and start on an aërial trip over the

burnt-up rocks. But all honour to her skill as a cook,—she did her fixings admirably!

During dinner I had ample time to take stock of Doctor Ephraim Meadows. His face would have been a fortune as a study to a painter; his forehead high but narrow, his eyebrows thick, bushy, and overhanging; his hair would have joined his eyebrows, had not a narrow line of yellow skin formed a kind of boundary between them. Peering out from beneath his shaggy hair were two little twinkling, restless grey eyes, more roguish than good-natured. His nose, crooked and sharp, was like the beak of a buzzard; with thin dry lips that shut in a straight line, which told in pretty plain language he could be resolute and rusty if need be. The tip of his chin, bent up in an easy curve, was covered with a yellowish beard, that had been guiltless of comb or shears for many a day. His nether limbs were clad in leather never-mention-ums, kept up by a wide belt, from which dangled a six-shooter. A red shirt, with an immense collar that reached the point of the shoulders, and a dirty jean jacket completed his costume.

Our meal over, we started out to see the wonders of the doctor's establishment. The house or hospital, as he designated it, was a

long frame-building, divided into numerous small rooms, all opening on a kind of platform that extended the entire length of the building; and sheltered overhead by a rough kind of verandah. A camp-bed, wash-basin, and stool constituted the furniture of each apartment. Four sickly-looking men were walking feebly up and down the platform. These, the Doctor assured me, were giants, now as compared to what they had been ere they stumbled on the Tuscan Springs and his water-cure.

The springs are about ten in number, but not all alike. In some of them, the water rises at a temperature near to boiling, and densely impregnated with sulphuretted hydrogen-gas, perfectly poisoning the air with a most insufferable stench. In others, again, the waters bubble up tepid, but bitter and saline. From two of them, that widen into pools, gas (I imagine some compound of hydrogen) rises constantly to the surface; and when I applied a match to the water, a sudden flash lighted up the pool for a second or two, and this could be repeated at intervals of three or four minutes. This gas, by a simple contrivance, is collected and conveyed into a small shanty, dignified with the name of 'Steam Bath,' the gas being used to heat the water

from one of the springs so as to fill a small room with steam.

It is one of the most singular and interesting places I have ever visited. There can be no doubt that the springs rise from the crater of an extinct volcano, and that there is some active volcanic action still going on in the depths below. Incrustations of various salts and sulphur covered the edges of the pools and rocks over which the water runs. The water they drink has to be brought from a spring the other side of the encircling hills.

Although at this place I observed more direct evidence of some great internal fire or subterranean laboratory, in which Nature is ever transforming the elemental forms of crude matter into available materials for the supply of organic life; still throughout Oregon and California I have constantly come across similar sulphurous and saline eruptions, particularly soda-water springs, where the water rises through the earth, thoroughly impregnated with carbonic-acid gas. At Nappa, not far from San Francisco, native soda-water is collected and bottled at the springs for the supply of the San Francisco market. Olympian nectar was never more grateful to the

thirsty gods, than is this soda-water to the hot, parched, and thirsty hunter!

The Doctor had many strange and wild theories about these springs, and evidently entertained a lively belief in their close proximity to his Satanic Majesty's kitchen.

'Cap'en,' said the doctor, 'I calkilate you ain't a-goin' home without just tryin' a bath?'

I at first declined. I did not feel at all ill, and as I bathed every day grudged the trouble of undressing. It was of no use—the Major joined the Doctor; persuasion failing, mild force was hinted at if I did not comply. I was led, or rather hustled, into the bathing-house. In one corner of this dismal-looking shed was an immense square tray, and over it was a most suspicious-looking contrivance, like the rose of a giant's watering-pot. I shuddered, for I knew I should be held in that tray, and deluged from the terrible nozzle.

My miseries commenced by my being seized on by two brawny attendants (the bathers), and literally peeled like an onion, rather than undressed. This completed, a small door that I had not noticed before was opened, and disclosed a kind of cupboard, about six feet square. A

flap of board was raised by an attendant, and supported by a bracket; a contrivance one frequently sees in small kitchens to economise room. On this I was laid; my janitors withdrew, the door slammed, and I was alone in the dark.

A sudden noise, between a hiss and a whistle, enlightened me as to the fact, that sundry jets of steam were turned on. The room rapidly filled, and the perspiration soon streamed from my skin. At first I fancied it rather pleasant; a sort of lazy sleepy feeling came over me, but as this passed away I felt faint and thirsty, and yelled to be let out. No reply. I began to think it anything but a joke, and again shouted: not a sound but the hissing steam.

My thirst grew insupportable; it seemed as if a live crab was gnawing and rending my stomach with his claws and nippers. I made several attempts to get off the table, but whenever I put my leg the burning-hot steam came like a flame against it, and there was not sufficient room to stand betwixt the table and the partition of my steam-prison. I called louder and louder; my reasoning powers were growing feeble, my presence of mind was rapidly abandoning me, and a thousand wild fancies passed through my brain; I had given up all hope, when

I saw a gleam of light. I have a vague remembrance of being dragged out, plunged into cold water, and savagely rubbed with a kind of hempen rasp.

As I became quite conscious of what was going on, I was partly dressed, and lying on the grass, the Doctor and the Major standing close by, the bathers rubbing my hands and feet; whilst Aunt, squatted on a log, was holding a cup containing some steaming mixture.

'O Doctor!' I said, as well as I could articulate, 'a little more, and you would have had to bury me; I was nearly gone!'

'Waal, Cap'en, I kind of guess you must have had a near shave for life, but it warn't meant no-how. You see the Major and me just strolled up to take a peep at the mustangs, and the darned brutes stampeded, breaking clean out of the "corral," and went past the bath-house like mad. The boys see 'em, and hearin' us a-hollerin', made tracks right after 'em, and never thought about your bein' a-steamin'. Old Aunt, by sheer luck, heard you a-screamin' and a-snortin', and it mighty nigh skeert the old woman to death, for she thought "Old Hoof" was a-bilin' himself. Up she came a-tearin' and a-shriekin' that somethin' unearthly was in the steam-

room. "Thunder and grizzlys," says the Major, "the boys have forgot the Cap'en, and gone right after the mustangs!" You'd better believe we soon had you out, and you ain't none the worse for it, thank Providence!

The combined powers of Aunty's mixture and the Major's whisky-flask rapidly restored me. The villanous mustangs—the cause of my mishap—were caught and saddled. Danger past is lightly thought of, and we enjoyed a hearty laugh as the Major quaintly told the story at the Bluffs of the Cap'en's bath at the Tuscan Springs.

CHAPTER X.

THE START FROM RED BLUFFS—MISHAPS BY THE WAY—DEVIL'S
POCKET—ADVENTURE AT YREKA—FIELD-CRICKETS—THE CALI-
FORNIAN QUAIL—SINGULAR NESTING OF BULLOCK'S ORIOLE.

April 28th.—My pack-train is completed, my provisions arranged for packing on the mules. I have eighty-one mules and a bell-horse. To manage mules without a horse carrying a bell round its neck is perfectly impossible. The bell-horse is always ridden ahead, and wherever it goes the mules follow in single file. (But of this and packing I shall have more to say further on.)

April 29th.—Sunday.

April 30th.—I have determined to find my way through Oregon by an unknown route; doing this, I shall reach the Commission at least two months earlier than by taking the ordinary mail-route to Portland.

Again and again I am warned of the risk not only of losing my mules and men, but my own scalp into the bargain. The country swarms with hostile Indians, many large streams have to

be crossed, the trail is bad, if any; and altogether the prospect is anything but cheering. I have, however, made up my mind to go.

The annoyances of a start got over—wild mules reduced to a state of discipline, packs adjusted, and men as sober as could reasonably be expected—all went pleasant as a marriage-bell until the second day, when my first misfortune happened.

May 1st.—I camp on a beautiful bit of ground, with grass in abundance, and a stream, clear as crystal and cold as ice, rippling past close to my fire. I place a guard over my mules, fearing accidents; and choosing as level a spot as I can see, roll myself in my blanket, and with my head in my saddle soon slept.

I awoke at sun-up, lit my pipe, and wandered off to see what had become of my mules. I found the trusty guard sound asleep, coiled up under a tree, but not a mule. A sharp admonition, administered through the medium of my foot, soon dispelled his dreams, and awoke him to a lively sense of reality. He rapidly uncoiled, started up, stared vacantly around, and thus relieved his feelings:—

‘I guess they’re gone, Cap’en, every tarnation coon of ’em, right slick back to the Bluffs.’

I could have pistolled the rascal there and then, but the mules had to be recovered; so I bottled up my wrath, roused all my sleeping camp, and we started in pursuit of the missing culprits.

May 4th.—Three days have elapsed. I have got the mules together, but three are still absent. Again we started. I made a long march, crossing Cottonwood Creek, through Major Raddon's ranch — one of the finest in California for grazing — struck the Upper Sacramento, and camped about sundown on a creek called Stillwater.

May 5th.—In the night it came on a deluge of rain, that regularly soaked through everything; but it cleared towards morning, and we dried ourselves in the sun as we rode along.

The next three days we travelled through a beautiful parklike country, very lightly timbered, covered with grass, and thickly dotted with magnificent ranches (farms); we struck Pitt river on the fourth day, crossed it safely, swam the mules, and ferried over the packs.

May 9th.—Our journey for the first twelve miles lay through a narrow rocky gorge—the trail; simply a ledge of rock, barely wide enough for a mule to stand upon. Three hundred feet

below rolled the river. The least mistake—a single false step, and over goes mule or man, as it may be, and you see the last of him.

Here I passed a most curious place called the Devil's Pocket; the trail winds along the very edge, and you peer down into an immense hollow kind of basin, that looks as if it had once been a lake, and suddenly dried up. The hills are lofty, sharply pointed, and capped with snow.

At the head of this gorge I, for the first time, saw an encampment of Digger Indians, and a more famished picture of squalid misery can hardly be imagined. Their wretched comfortless huts are like large molehills; there is a pit sunk in the ground, and a framework of sticks, shaped like a large umbrella arched, over it; old skins and pieces of bark are thrown over this frame, and the whole is covered with earth. The entrance is a hole, into which they creep like animals.

Their food consists principally of esculent roots of various kinds, which they dig during the summer months, and dry in the sun. The field-cricket (*Acheta nigra*) they also dry in large quantities, and eat them just as we do shrimps. Bread made from acorn-flour is also another important article of their diet. They seldom fish

or hunt. Their arms are bows and arrows ; their clothing, both male and female, simply a bit of skin worn like an apron ; they are small in stature ; thin, squalid, dirty, and degraded in appearance. In their habits little better than an ourang-outang, they are certainly the lowest type of savage I have ever seen.

We camped in the evening on a large plain called Big Flat.

May 10th.—It was bitterly cold all night, and froze sharply. We got off soon after sun-up, and literally crept along the side of a high range of mountains, densely wooded, and forming one side of the valley of the Sacramento, which has dwindled down into a mere mountain-burn. Here I came suddenly on a little colony of miners, engaged in gold-washing. I discovered the place was named Dogtown—the entire town consisting of a store, a grogshop, and a smithy. I paid twenty-five cents (a shilling) for a mere sip of the vilest poison I ever tasted, libelously called ‘Fine Old Monongahela Whisky.’ About six miles farther, still on the same trail, I came to another gold-claim, where there were no houses at all, called Portuguese Flat. Passed through some thin timber ; camped on a lovely mountain-stream.

about ten, and put up at the 'What Cheer House,' bespoke my bed, and ordered breakfast. The keen morning-air and a thirty-mile ride had made me perfectly ravenous, and I waged alarming havoc on the ham and eggs, fixings, and corn-dodgers, that, I must say, were admirable. The tea was not a success, being a remarkably mild infusion, very hot, and sweetened with brown sugar; but it washed down the solids, and the finest congou could not have done more.

Thus recuperated, I started off to call on Judge——, to whom I had a letter of introduction from my agents in San Francisco. It did not take long to find the Judge's quarters, the lanes, streets, and alleys being distinctions without any material differences. The mansion in which his judgeship 'roomed' was a small shanty, with a porch or verandah round it, to keep off the sun when it happened to be hot, and the wet when it rained. I knocked with my knuckles—no reply; tried again—still silence; resorted to the handle of my hunting-knife, anything but mildly—that did it.

'I raither calkilate, stranger, you'd better jist open that door; *I* ain't agwine to, you bet your boots.'

I opened it, and walked in. There sat Judge

— in a large armchair, cleverly balanced on the two hind-legs. No, it was not sitting, or lying, or standing, or lounging; it was a posture compounded of all these positions. His (I mean Judge —'s) legs were extended on a level with his nose, and rested on the square deal table before him. He was smoking an immense cigar, one half of which was stowed away in his cheek, rolled about, and chewed; whilst the other half protruded from the corner of his mouth, and reached nearly to his eye. A little distance from the Judge was an immense spittoon, like a young sponging-bath. He was 'whittling' a piece of stick with a pocket-knife, and looked the embodiment of supreme indifference. The chair he occupied and the table—whose only use, as far as I could see, was to rest his legs on—constituted the entire furniture.

The Judge himself was a long spare man, and gave me the idea of an individual whose great attribute consisted in possessing length without breadth or thickness; everything about him was suggestive of length. Beginning at his head, his hair was long, and his face was long, and his nose was long, and a long goatee-beard terminated the end of his chin; his arms were long, and his legs were long, and his feet were long; he had a long

fellow when you understood him), and retiring to my inn, determined to enjoy the luxury of a bed and a long night-in, having slept on the ground since leaving Red Bluffs; and if the Judge was right about the redskins, the chances were considerably against my ever stretching my limbs on another. So, to make the most of it—for a start at sun-up and a long ride, added to a tedious day, had pretty well fagged me—I retired very early, and turned in.

It really was a lovely bed, just like bathing in feathers. I stretched out my limbs until they fairly cracked again, and rolled in enjoyment. My thoughts were soon wandering; and visions of home, mixed up with mules falling over precipices, battles with Indians, an ugly feeling round the top of my head, judges, drinks, rowdies, all jumbled together in a ghostly medley—floated off in misty indistinctness, and I subsided into the land of dreams.

I awoke, with an indistinct idea that I was at a ball, with a jiggy kind of tune whirling through my brain. Pish! I must have been dreaming; so I turned over, and tugged the blankets more tightly round my shoulders, vexed that such a stupid dream should have awoken me. Hark! what on earth is that? ‘Ladies and gents, take

your places, salute your partners,'—then crash went two fiddles, crowding out a break-down. Again the voice—'Half right and left'—and off they went. The sounds of countless feet, scuffling rapidly over a floor, told me, in language not to be mistaken, that a ball was going briskly on very near my head.

I sat up, rubbed my eyes, took a long mournful yawn, and began to consider what had best be done. I discovered that a thin wooden partition only intervened betwixt my head and the ball-room; everything rattled to the jigging tune of the music and the dancers; the windows, the doors, the wash-crockery, the bed, all jiggled; and I began to feel myself involuntarily nodding to the same measure, and jigging mentally like the rest. Shades of the departed! I could not stand this. Goodby bed, and feathers, and sleep! I may as well dance in reality as in imagination; and abandoning all my anticipated delights, dressed, and entered the ball-room.

It was a long room, lighted with candles hung against the wall in tin sconces; the company—if variety is charming—was perfect. The costumes, as a rule, were more suggestive of ease than elegance; scarlet shirts and buckskin 'pants' were in the ascendant. The boots as a rule,

never-failing spring from which to draw fresh draughts of household knowledge. At last the cotillon was called by the master of the ceremonies, and again I heard—'Take your places, salute your partners;' the fiddles started the same kind of jigging tune, and away we went.

A cotillon is a compound, complicated kind of dance, evidently constructed from the elements and fragments of many other dances: a good deal of quadrille, a strong taste of lancers, a flavour of polka and waltz—the whole highly seasoned with Indian war-dance. You never stand still, neither can you lounge and talk soft nothings to your partner—it is real, *bonâ fide*, downright, honest dancing. I soon discovered why the men left off their jackets: a trained runner could not have stood it in clothing. My jacket and waistcoat soon hung on a peg, and, red-shirted like the rest, I footed it out gallantly.

My partner was a gem, with the endurance of a ballet-girl in pantomime time. How many cotillons we got through I never clearly remembered; but we danced on, till the grey morning light, stealing in through the windows, warned the revellers that Old Sol was creeping from behind the eastern hills, and that the day, with all its cares and toils, was near at hand once more.

My fair partner positively refused to allow me to see her home. Being a casual acquaintance and not a lover, I suppose, of course, that it was highly proper on her part. I thanked her sincerely, for I really felt grateful to her for enabling me to dance away a night that I had destined for a long luxurious repose. With a hearty 'good-night' we parted, never to meet again.

It was a glorious morning—the air cool and fresh, the sky unflecked by a single cloud. The sun was just tipping the hilltops with rosy light, and peeping slyly into the valleys, as I wandered out to think over my strange adventure. My way led by chance up the back of the street, and out by a little stream to the gold-washings. Early as it was, all was bustle and activity. Many of my friends of the ball were now wrestling the yellow ore from its hiding-places, the anticipation of gold dispelling all sense of fatigue. The want of water is a great drawback to these diggings. So valuable is it, that it has been brought by a small canal a distance of thirty miles, and is rented by the miners at so much a cubic foot.

I lingered here some time, for there is much to see, then turned my steps towards my inn through the city.

May 11th.—Shotgun Creek; my camp is on the side of a steep mountain, and, about a mile farther on, is another stream, Mary's Creek. Camped on this stream was a small pack-train, that had been with stores to some mining-station. I heard wolves barking and howling all night, and twice I drove them out of my camp with a fire-log. The next morning, as I passed the camp of the packers, they were in sad grief. The rascally wolves had pulled down one of their mules, and torn it almost to pieces. I rode up in the wood to see its mangled remains. The ravenous beasts must have fixed on its haunches, and ripped it up whilst it lived. I was sadly grieved for the poor beast that had come to so untimely an end, and for the man who had lost him—at least 30/. worth.

For two more days I followed up the course of the Sacramento, and crossed it for the last time. Standing at the ford, and looking straight up the valley, the scenery is wild and beautiful in the extreme; on either side sharp pinnacle-like rocks shoot up into all sorts of fantastic shapes, dotted with the sugar-pine, scrub-oak, and manzanata in front; and blocking up, as it were, the end of the valley, stood Mount Shasta, at this time covered to its base with snow.

This vast mountain is a constant landmark to the trappers, for it can be seen from an incredible distance, and stands completely isolated in the midst of the Shasta plains. I camped close to the very snow at its base, in a little dell called 'Strawberry Valley.' The next day reached the Shasta plains, and camped early in the day.

May 15th.—As I was to bid goodby to civilisation, and abandon all hopes of seeing aught but savages, after leaving this camp, and being by no means sure of the road, I made up my mind to ride into Yreka and obtain information about the Indians, and the state of the trails, and also (what was of equal importance) obtain a relay of provisions; the distance from my camp to the city was about thirty miles.

Yreka city is a small mining-station, situated on one side of the great Shasta plains; it stands quite away from law, society, and civilisation, gold being the magnet that attracts first the miner, and then the various satellites (jackals would be the more appropriate name) that follow his steps. I left the mules in charge of my packmaster, and started at sun-up. The ride was a most desolate affair, over an interminable sandy plain, without even a shrub or flower, much more a tree, to break the monotony. I reached Yreka

drawling utterance, and was inordinately long at arriving at a moderate pitch of civility. He eyed me over and drawled out, 'W-a-e-l!' I handed my letter, and quietly awaited its effect; as he was long in everything else, he was long in opening it. Having made a minute inspection of the exterior, he slowly took it from its yellow envelope, and gradually seemed to understand from its contents that he was to be civil.

'So you ain't bin long in these parts, Cap'en?' said the Judge, without in the smallest degree shifting his position.

I said I was quite a stranger, and should be glad if he would give me some information about the trails and the Indians, along the route I intended taking.

'Bars and steel traps!' roared the Judge. 'You'll have your har ris, sure as beaver medicine! Why, thar ain't worse redskins in all Oregon than the Klamaths. Jist three months ago come Friday, the darn'd skunks came right slick upon Dick Livingstone and his gang. You've heerd of Dick, I guess?' (I said I had not.) 'Wael, most people has, leastways. They was jist a-washing up a tall day's work, up Rogue river, when the Klamaths swarmed 'em just as thick as mosquitos in a swamp. Several went under, bet your life, for Dick and his boys

warn't the ones to cave in. But 'twarn't no use; the reds jist crowded them clean down, and took the har off everyone of 'em. The trails, too, is awful soft. Mose Hart says—and he's now from Bogus Holler, whar you have to go—that a mule is jist sure to mire down a'most any place.'

'Well,' I said, 'your news is not by any means refreshing, Judge; nevertheless, I mean going.'

'Wael, Cap'en, maybe you're right; makin' back-tracks ain't good, anyway; we are a go-ahead people, we are, and it won't pay to be skeerish, anyway. S'pose we go and take a drink, and I'll jist put you through the city; I guess I'm well posted about most things in these diggins.'

So we did the city, which did not take very much time to do; we did the stores, where every person, from the master to the errand-boy, did nothing but sit on the counter to chew, whittle, and spit. The amount of whittling done in this city is perfectly astounding; every post supporting the verandahs outside the stores and bar-rooms was whittled nearly through; some of them in two or three places. We did the bar-rooms, and did sundry drinks with divers people. I purchased provisions, hired a guide, took leave of the Judge (who was not half a bad

being of the species known as Wellingtons, were worn outside the trousers, inducing the latter indispensables to assume a bunchiness about the knees, not calculated to display the symmetry of the leg to advantage. Very few had any jackets on, but all, without exception, carried a bowie-knife and six-shooter in their waistbelts. The ladies' costumes were equally varied: most of them wore bright-coloured muslins, of very large patterns, and showy waist-ribbons, tied behind in a large bow, with streamers down to their heels.

The dance was just 'down' when I came into the room. I saw a few citizens I had met in the day, but each one seemed to have his 'fancy gal,' and any chance of getting an introduction was a vain hope. The fashion, I discovered afterwards, is either to bring or meet your partner at the ball-room, and dance with her, and her only, all the evening.

A waltz was called, and I wanted a partner. Looking round, I espied a lady sitting near the end of the room, who evidently had not got one. She was in the same place when I entered the room, and it was clear to me, by her unrumpled appearance, that she had not danced for the evening. 'Faint heart never won fair lady' might, I imagined, apply as forcibly to dancing

as to wooing or fighting; if I am snubbed it won't be all the world, and I suppose I shall live it down—so here goes! Walking boldly up to her, I asked coolly, but rather apologetically, if she would try a waltz.

‘Guess, stranger, I ain't a-fix'd up for waltzin.’

‘Perhaps, madam,’ I said, ‘you will excuse me, although unknown to you, if I ask you to dance the next cotillon with me?’

Looking into my face with an expression half doubt, half delight, she said: ‘Stranger, I'll have the tallest kind of pleasure in puttin' you right slick through a cotillon, for I've sot here, like a blue chicken on a pine-log, till I was like to a-grow'd to the seat.’

This satisfactorily arranged, I sat down by her side until the waltz finished, to have a good look at and trot out my new inamorata. She was a blonde beauty, with fair hair and light-grey eyes, that flashed and twinkled roguishly; and robed in some white material, with blue ribbons in her hair and round her waist—a mountain-sylph, that any wanderer in search of a partner would have deemed himself lucky to have stumbled on. Our conversation was rather discursive, until I discovered that home-politics, or rather the duties and requirements of a *gal t'hum*, was a

‘Say—Cap’en—here—hold on!’

I turned, and saw a man in a one-horse dray, whipping up his horse, and violently gesticulating for me to stop. He soon came up, and jumping out of the dray, seized my hand, and shook it with a grip that made my very eyes water.

‘Guess you ain’t acquainted with this child?’

I said no; I had not the pleasure of knowing him.

‘I spotted you, Cap’en, just as soon as ever I seed you making tracks down the street. My gal Car’line told me how she put you through all the dance last night.’

It suddenly flashed upon me that the drayman was my partner’s papa. Here’s a lively affair! If he does not ask me my intentions, and riddle me with a six-shooter if I refuse to marry his ‘gal’ at once, I shall deem myself the most fortunate of men. I civilly said, in reply, that I found his daughter a most admirable partner.

‘I rather guess you did, Cap’en; she’s all watch-spring and whalebone, she is; can’t skeer up a smarter gal than “Car” in these parts, if you was to do your darndest. She! why, she’s worth her weight in nuggets to the man as gets her.’

I felt cold all over—I thought it was coming. ‘You must excuse me,’ I said; ‘my breakfast is waiting, and I daresay we shall meet again.’ (I knew this was an awful twister.)

‘I’m sure we shall, Cap’en. Let’s licker:’ so we adjourned to the nearest bar-room and took an ‘eye-opener,’ and so I escaped from the drayman. I drew a deep breath, and felt as if I had got clear from the claws of a grisly bear—made for the inn as fast as I could, gobbled up a hasty breakfast, packed up my goods, and with my guide started for my camp.

Often I turned and gazed anxiously over the plain, expecting I should see the drayman, his daughter Caroline, and a priest in hot pursuit; and there and then, on the Shasta plains, I should be, *nolens volens*, linked to my fair-haired partner, for a life’s cotillon!

Such was my first, and such was my last, my only night in Yreka! ‘All’s well that ends well,’ and I trust the fair Caroline has as pleasant a remembrance of the Cap’en as he has of her!

I found my camp all right, saddled up, and am off on my perilous journey through the wilds of Oregon. The Shasta plains are vast sandy flats, half prairie, half desert, sparsely covered with withered grass, and not a bush or tree or

shrub, as far as the eye could wander, had struggled into life. 'Tis true a stunted artemisia, or wild-sage bush, had fought its way inch by inch in its struggle for existence, and looked so old, dry, and parched, that your idea was, if you laid a finger on it, it would powder up like dried herbs; but whatever had been in shape of grass, or herb, or shrub, was gone, cleared bodily and entirely away by the field-crickets.

Never shall I forget this insect array. On getting well upon the plains, I found every inch of ground covered with field-crickets; they were as thick on the ground as ants on a hill; the mules could not tread without stepping on them; not an atom or vestige of vegetation remained, the ground as clear as a planed floor. It was about twenty good long miles to the next water, and straight across the sand-plains, and, for that entire distance, the crickets were as thick as ever. It is impossible to estimate the quantity; but when you suppose a space of ground twenty-seven miles long, and how wide I know not, but at least twice that, covered with crickets as thick as they could be packed, you can roughly imagine what they would have looked like if swept into a heap.

It was long after sundown when we reached the water, tired, thirsty, and utterly worn-out;

but the stream being wide and swift, the crickets had not crossed it, so our tired animals had a good supper, and we a comfortable camp. I rode off to some farm-enclosures I saw, in search of milk and eggs; and, to my great surprise, I noticed every field had a little tin-fence inside the *snake* or *rail* fence, about six or eight inches wide, nailed along on a piece of lumber, placed edgeways in the ground, so that a good wide ledge of tin projected towards the prairie.

‘What,’ I said to the first farmer I met, ‘induces you to put this tin affair round your field?’

‘Why, stranger, I guess you ain’t a-travelled this way much, or you’d be pretty tall sure that them darned blackshirts out on the prairie would eat a hoss and chase the rider. But for that bit of a tin-fixin’ thar, they’d mighty soon make tracks for my field, and just leave her clean as an axe-blade. These critters come about once in four years, and a mighty tall time they have when they do come!’

It was a most effectual and capital contrivance to keep them out, for if they came underneath the tin they jumped up against it, and it was too wide to leap over. These field crickets (*Acheta nigra*) are black, and very much larger than the ordinary house-cricket. They eat

seeds, grass, fruit, and, when they can get nothing else, they devour each other. I frequently got off my horse to see what a large mob of crickets were about. They had dragged down, perhaps, two or three others, and were one and all deliberately tearing them to pieces. If they meet head to head, they rush at each other and butt like rams, but, backing against each other, they lash out their hind-legs and kick like horses. What becomes of them when they die I cannot imagine; the entire atmosphere for miles must become pestilential. I suppose, from their coming in such vast numbers every fourth year, that the larvæ must take that time ere they assume the perfect shape.

May 16th.—The Californian quail, which I found most plentiful along the course of the Sacramento, ceases at the edge of this great sandy desert; it appears to be the limit to its northern range. I note a singular instance, how curiously and readily birds alter their usual habits under difficulties, in the nesting of Bullock's Oriole. A solitary oak stood by the little patch of water, a spring that oozed, rather than bubbled, through the sandy soil where my camp stood; it was the only water within many miles, and the only tree too; every available branch and spray had one

of the woven nests of this brilliant bird hanging from it. I have never seen them colonise elsewhere. The nests are usually some distance from each other, and concealed amidst thick foliage.

CHAPTER XI.

CROSSING THE KLAMATH RIVER—HOW TO SWIM MULES—
SIS-KY-OUÉ INDIANS—EMIGRANT FORD—TROUT BALING—A
BEAVER-TOWN—BREEDING-GROUNDS OF THE PELICANS AND
VARIOUS WATER-BIRDS—PURSUED BY KLAMATH INDIANS—
INTERVIEW WITH CHIEF—THE DESERT PRONG-HORNED ANTE-
LOPES—ACORNS AND WOODPECKERS—YELLOW-HEADED BLACK-
BIRDS—SNAKE SCOUT—ARRIVAL AT CAMP OF COMMISSION—
END OF JOURNAL.

May 17th.—Leave this sandy waste, cross over a low divide, and descend into a narrow gulley, named Bogus Hollow. Creep along between high craggy peaks for ten miles to reach the Klamath river, a wide, rapid stream that I have to cross, but how, just now is a puzzler. The banks are high; not a tree grows along its sides, or near by, where-with to make either canoe or raft. I follow on its course for eight miles; the river makes a sudden bend, and in the angle on the opposite side I can see the charred remains of a log-shanty, amidst a clump of trees, one of which has been felled so as to fall across the river, and forms a rude foot-

bridge. We unpack the mules, carry all the packing-gear and provisions on our own backs to the other side, an operation requiring steady heads and sure feet, the footway a single tree, and not even a handrail to steady the crosser. All safely over, and no mishap.

The next operation is to swim the mules, a very simple process if properly managed; a risky and dangerous one if due precautions are neglected. The strength of the current must be estimated, so that the mules may be driven up-stream far enough, to ensure their not being washed farther down the opposite side, than where you are desirous they should land, and the place selected for them to land should always have a shelving shore. Supposing you have a canoe, the bell-horse, deprived of his bell, is towed by the canoe across the stream; a packer, standing in the canoe, keeps ringing the bell violently; the mules, that have followed their leader to the edge of the stream, are prevented galloping along the river-bank by the packers; at last, in sheer despair, they dash into the water and swim towards the clanging bell; nothing can be seen but long ears and noses, or heard save the tinkling bell, the splashing water, and a medley of snorts, ranging from a shrill whistle to a sound compounded of

creak and groan, gasped from the older, asthmatical, short-winded mules. If we have no canoe, the bell-horse is ridden into the water; when the rider feels the horse begins to swim, he grasps the mane with his left hand, floats from off the horse's back, swims with his legs as in ordinary swimming, whilst with the right he splashes the water against the horse's face, thus keeping the animal's head always up-stream. On reaching the opposite side, when the horse's feet touch the ground, the man again drops astride, and rides it out, ringing the all-potent bell with all his might.

I learn from my guide that a settler 'squatted' where we cross about a year before, built the shanty, made the footbridge, and put in some grain-crops; but the Indians discovered, killed, and scalped him, burnt his shanty, and carried his wife away prisoner—not a cheering story, considering I am going through their very strongholds.

May 18th.—A sharp frosty morning; very cold, sleeping in the open air. Get away soon after sun-up. Leave the flat grassy valley, and ascend the timbered slopes of the Sis-ky-oue mountains. Follow a bad Indian trail, through barren gorges, and along rocky ledges, for twenty miles; observe lots of deer-tracks, but no deer. Descend the

northern slope, arrive at the Emigrant's Ford, and come plump upon a large encampment of Sis-ky-oue Indians. Fifteen miles to the next water; the sun rapidly sinking; men and mules tired. At all risks, I camp near the redskins.

The Emigrant Ford is a wide, lake-like expanse of the Klamath river, that spreads out over a level plateau on emerging from a basaltic gorge, through which the river finds its way for some distance. The walls of rock shutting it in being deep and almost vertical, reaching the water in the cañon is an impossibility. As the river widens out it shallows sufficiently for ox-teams and waggons to get through it; and, being almost the only fordable place, was always chosen by emigrant trains coming to Oregon and California.

The remains of half-burnt waggons and human bones still bleaching in the sun, makes one shudder to think of the terrible fate of the weary wanderer, cut off at this fatal spot by the Indians. Their plan was to remain concealed until the trains were all safely through, then to swoop down upon them, while scattered and disordered by crossing, cut loose the oxen, kill the men, carry off the women and children, if girls, burn the waggons, and secure all that suited them in the shape of plunder.

The Indians near my camp were fishing in a small mountain-stream, if baling out fish by the bucketful could be called fishing. Round-fish (*Coregonis quadrilateralis*) and brook-trout (*Fario stellatus*) were in such masses (I cannot find a better word) that we dipped out, with baskets and our hands, in ten minutes, enough fish to fill two large iron pails that we carried with us. How such hosts of fish obtain food, or where they find room to deposit their ova, are mysteries. The Indians were splitting and drying them in the sun strung on long peeled rods.

May 19th.—Had no trouble with these Indians. Hire two of them to aid me in again crossing the Klamath river, where it runs from the upper into the lower Klamath lake. For the first four miles we ascend a steep mountain, rather thickly timbered. Killed a grey deer, and saw a splendid herd of wapiti; but the bell frightened them, so I did not get a shot. Cross the ridge, and descend on an open grassy flat, surrounding the lower Klamath lake, which I should say, at a rough guess, is thirty miles in circumference. It is in reality more like a huge swamp than a lake; simply patches of open water, peeping out from a rank growth of rushes at least twelve feet in height.

I should think this place must be the 'head

centre' of the entire beaver population of Oregon ; in some of the patches of open water, there certainly was not room to jam in even a tiny Beaver cottage of the humblest pretensions, although the open space occupied by the town was many acres in extent. The trees, although a good half-mile from the water, were felled in all directions, as if busy emigrants had been making a clearing. The branches, lopped from the fallen trees, had been dragged by these busy animals along the well-beaten roads, that led in all directions, from the timber to the rushes, through which roads were also cut, to gain an easy access to the water.

The branches, many of them large and heavy, are dragged by the beavers—backing along the roads, two or three often assisting in tugging a single branch—until the water is reached ; then they seize it with their chisel-like teeth, and using their powerful tails, both as rudders and screw-propellers, float it out, to be employed in building their dome-shaped residences. But of this more at length, when referring to the habits of the beaver.

Wildfowl too are here, in great variety and abundance. For the first time I see the breeding-ground of the Rough-billed Pelican (*Pelicanus*

erythrorynchus). Their nests were on the ground, amidst the rushes, but unluckily I did not succeed in finding an egg. The nest is simply a confused heap of rushes, with a lot of down and feathers in the centre. On the water these huge birds swim as easily, buoyantly, and gracefully as swans; and in fishing, do not swoop down from a height, as does the brown pelican, but thrust their heads under water, and regularly spoon up small fish with their immense pouched beaks.

Where could one find a more enjoyable sight, whether viewed with the eye of a naturalist or lover of the picturesque? Before me is the reedy swamp, with its open patches of water, glittering like mirrors in the bright sunlight, rippled in all directions by busy beavers: some making a hasty retreat to their castles, others swimming craftily along, crawl on to the domes and peep at the intruder. Dozing on the sandbanks round the margin of the pools, or paddling with 'oary feet' on the smooth water, are numbers of snowy pelicans: the bright orange encircling the eyes, and colouring the pouch, legs, and feet, looks like flame, contrasted with the ~~white~~ feathers, so intensified is the color by the brilliancy of the sun-rays. Pintails, shovellers, stockducks, the exquisitely

coloured cinnamon teal, the noisy bald-pate, and a host of others, are either floating on the water or circling round in pairs, quacking angry remonstrances at such an unjustifiable prying into their nuptial haunts. Overhead, vieing with the swallows in rapidity and grace of flight, countless Terns (*Sterna Fosteri*) whirl in mazy circles: their black heads, grey and white liveries, and orange-yellow beaks, show to great advantage against the sombre green of the swallows, amid which they wing their way. Behind me, and far to the right, the Siskiyou Mountains, in many a rugged peak, bound the sky-line, their slopes descending in an unbroken surface of pine-trees to the grassy flats at their base. To my left, the river that feeds this rushy lake winds through the green expanse, like a line of twisted silver, far as the eye can scan its course; along its bank my string of mules, in dingy file, pace slowly on: the tinkle of the bell-horse, but faintly audible, bids me hasten after them, and leave a scene the like of which I shall never perhaps gaze on again. I did not see any nests of the Tern, although I have but little doubt they breed about these lakes.

Follow the stream and pass a second kind of rushy lake, not nearly so large as the one behind, and reach the southern end of the great Klamath

lake, out of which pours a rapid stream, two hundred yards in width, and very deep; camp on its edge, and set to work to discover some means of crossing.

The smoke of my camp-fire has barely reached above the trees, when Indians are seen coming from all directions, some on horseback, others on foot; and canoes in fleets dot the lake, that stretches away until lost in the distance, like a fresh-water ocean. I feel very uneasy. The two Sis-ky-oues have gone, vanished mysteriously. Hastily collect dry wood and light a circle of fires, within which I enclose my mules. I am mobbed by ugly half-naked demons, who are evidently doubtful whether to be friends or foes. By aid of my guide, I manage to bargain for two canoes.

May 20th.—Never laid down all night. Kept the packers guarding my mules, stationing a man between each of the fires. Indians in full force at sun-up. In two hours cross all my stores in the canoes; swim the mules, and without any accident we are safely over the river.

This tribe, the Klamath Indians—the chief of whom, Le-lake, is a man of considerable influence—number about 2,000, and own large herds of horses and cattle. They are nearly always at war, and are the terror of emi-

grants. The men are well-grown and muscular; they wear little more than the breech-cloth, and most of them still use the bow and arrow. The squaws are short in comparison with the men, and for Indians have tolerably regular features. The men use no saddles, and a strange sight it is to see a number of these demons nearly naked, painted from their heads to their waists, all colours and patterns, skying and whirling round upon their half-tamed beasts, yelling and shouting, with no apparent object that I could discover but that of exhibiting themselves and trying to frighten me.

The morning is dark and cloudy, with a sharp keen wind. Keep close to the shore of the lake, which for the first fifteen miles is shut in by high mountains. The trail winds along the side of this mountain, in some places over bare rock, at others loose rolling stones render it very dangerous and difficult to get over. Emerging on an open sandy plain, about seven miles in width, we cross it, still close to the lake. Then hill again, but not so steep. Reaching an open prairie covered with grass, camp on a small stream, with decent wood on its banks. During the whole day I was beset and worried by Indians riding in among my mules, galloping forward, then back again, from



one end of the train to the other, in a most excited state.

Immediately on camping I am again thronged, so ride on to see the chief at his lodge, about four miles from camp; having first enclosed my mules in a ring of fires, and desired my men, in case I do not return in two hours, to abandon the mules and escape as best they can. I find the chief's lodge, in the centre of a very extensive Indian village, situated on the bank of a swift stream. All the lodges are dome-shaped; like beaver-houses, an arched roof covers a deep pit sunk in the ground, the entrance to which is a round hole; through it I descend into the sable dignitary's presence, his lodge differing from the others only in being rather larger, and having more dogs and children round it.

Face to face I stand alone with the dreaded chief—more like bearding a hog in its styer than the Forest Monarch, or the Scottish Douglas, in his stronghold. On a few filthy skins squats a flabby, red-eyed, dirt-begrimed savage, his regal robe a ragged blanket tied round his waist. Sot and sensualist are legibly written on his face, and greed, cruelty, and cunning visible in every twist of the mouth and twinkle of the piglike eyes. My heart misgives me

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when I think my men, the government property, and my own life, are entirely in the hands of this degraded beast.

Addressing him in Chinook, which he fortunately understood, I explained what my mission was, asked him what he meant by sending armed braves in full war-paint, without any squaws, amongst my mules and men; that I was a 'King George's' chief, and what was more, that another and a much greater chief was awaiting my arrival on the banks of the Columbia, and if I failed to come when so many suns had set over the hills, he would seek me, and if harm had befallen me, would surely burn up all the lodges, drive off the horses, kill the braves, and perhaps hang the chief.

Handing me the all-potent pipe, he replied—'I am your brother; my heart is good; my people are assembling for a war-trail; I mean you no harm. Give me two bags of flour, to pay me for the grass your mules eat.' This I consent to, bolt through the hole like a fox, and gallop with all speed back to my camp. Not one word of all this do I believe; but take additional precautions to guard my mules, and quietly await the tide of events. About dusk the chief arrives in full war-paint, which consists of

alternate stripes of vermilion and white, arranged in all sorts of directions, and extending from his waist to his hair. We smoked together; the pipe passing round the circle of 'braves' (that might have been more justly styled 'ragged ruffians,' if they had worn clothes), the chief's bodyguard.

The chief of course wanted everything he saw, as a present; but this, at all hazards, I sternly refused. Finding nothing more was to be obtained by fair means, on receiving the promised payment, he left for the village.

The lake near which I am camped is a magnificent sheet of water, forty miles in length, with an average breadth of fifteen, shut in by steep hills not very heavily timbered, between which are fine open grassy valleys. Wildfowl in swarms dot its surface, and it abounds with fish—so the Indians tell me.

May 21st.—Another sleepless night, morning dark; a cold icy wind nearly freezes one's blood; start as soon as we can see. The chief tells me I can ford the stream near his lodge, but, doubtful of its truth, canter on ahead of the mules, and try it. Just as I thought, deep water; a ruse to get my mules swimming, and when scattered, to pounce upon and steal them.

Ride back towards my train, puzzled what course to pursue. An Indian gallops from amidst the trees, chasing two horses with a lasso, catches one, and proceeds rapidly down-stream. I follow quietly, about a half-mile; then he rides into the river, and, without wetting his horse's sides, gets on the other side.

This is a grand discovery. Gallop to my train. Ride in triumph through the ford, followed by the bell-horse and mules, and bow impudently to the flabby old deceiver, staring at me wonderingly as I pass up the opposite side of the stream.

Without stopping to rest, I push on over a swampy country, with little clumps of alder and cotton-wood-trees, like islands, here and there, for twenty-four miles; keep as close as possible to the edge of the river, until we reach a large morass, from which it heads. Here I camp. Although I have not seen the trace of an Indian since leaving the village, still I feel sure they will follow up my trail.

Light fires as usual, and keep strict watch over the wearied and hungry mules. The men are tired and sleepy; but, jaded as I am in mind and body, contrive to keep them up to their sentry-duty. They get an alternate sleep—I get none.

May 22nd.—Passed a miserably cold night.

Blowing nearly a gale of wind. Found all right in the morning. At daybreak get the mules together, and begin saddling. Two mules managed to slip off about fifty yards from us, when a sudden yell told me they were gone. The Indians had followed, and been concealed close to me in the bush all night, afraid to make an attack, but waiting a chance to stampede the band; this, from my having lighted fires, and kept watch, they were prevented from doing; however, they made good the two that strayed. I started after them, but deemed it prudent not to go too far. They also managed to steal a coat from my packmaster, with \$100 in the pocket.

From the high water the trail through the swamp is impassable, so I have to go round it, keeping along on the small ridges, where birch and alder grow; continuing this for about eighteen miles, and crossing several deep creeks and swamps, through which the poor mules are literally dragged, get on to higher and comparatively dry land, two miles of which brings me to the entrance of what my guide calls the desert. The distance across it, he says, is forty miles, with but one chance of water. Into this barren waste I did not think the Indians would follow, so make up my mind to push on, although my men and mules are

fearfully fagged. I thought the Indians intended to pursue us to the edge of this wilderness, and when off our guard, worn-out for want of sleep, killing us, and driving off the band of mules.

I am in the very paradise of the prong-buck (*Antilocapra Americana*). In bands of twenty or thirty they gallop close up to the mules, halt, have a good look, and suddenly scent danger; the leading bucks give a loud whistling snort, then away they all scamper, and rapidly disappear. We shot as many as we needed, but at this time the does we killed were heavy in fawn.

The size of the prong-buck, when fully grown, is somewhat larger than the domestic sheep; but its legs, being proportionably much longer, give it a greater altitude. The neck is also of greater length, and the head carried more erect. The hind-legs are longer than the fore ones; a wise provision, not only tending to give additional fleetness, but materially assisting it in climbing steep precipices and rocky crags, up and down which it bounds with astonishing speed and security.

The back is a pale dun colour; a transverse stripe between the eyes; the lip, and each side the muzzle, and a spot beneath the ear, dark reddish-brown; the entire underparts, the edges of the

lips, a large and most conspicuous patch on either side the tail, pure white. The white meeting the brown of the back about midway on the sides, forms a well-defined waving line. Horns, hoofs, and nose black. The horns (so marked a feature in the prong-buck) are placed very far back, and much compressed in a lateral direction to about a third of their height, where they give out a thin triangular bracket-shaped prong, projecting upwards and forwards. Above this snag, the horns have a shiny surface, are rounded, and taper gradually to a sharp tip, bent into a hook. The horns vary greatly in the males. I have sometimes shot them with the prong hardly developed, sometimes springing from the horn near the tip, and in others growing close to the head, where it is always uneven and warty. The female is devoid of horns, or only has them in a rudimentary condition.

The eyes of the prong-buck are black, large, and expressive, but not a trace exists of a *larmier* or *cramen*, a glandular opening beneath the eyes, so conspicuous in the generallty of deer. The hoofs are narrow and acute, but no trace exists of the supplementary hoofs usually found in all ruminants, situated just above the pasterns, at the back of the legs. The ears are very long, and

well adapted to catch the faintest sound. The hair is coarse, crimped or wavy; growing in a tuft on the forehead, and during summer in a mane on the neck and back of the male.

About the posterior third of the back is an opening like the tear-gland in the face of a deer, from which a musky-smelling secretion continually oozes. The animal has also the power of erecting the hair of the white patches on its rump, as a peacock spreads its tail, or a wolf bristles its back. This power of elevating, or apparently *puffing-out*, these snowy markings, adds immensely to the general beauty of the prong-buck. When wooing, or striving to make the most favourable impression on his harem of does, or when in defence of his wives he rushes at some intrusive rival, the snowy round patches are 'ruffed' to treble their natural size.

The geographical distribution of the prong-buck is rather extensive. North it is found as far as the northern branches of the Saskatchewan, 53° N. lat. It ranges over all the plains from the Missouri to the eastern slopes of the Rocky Mountains; southerly into Mexico, as far as the mouth of the Rio Grande; through Oregon and California, and into Washington Territory, along the banks of the Columbia, to the Spokane river.

Their favourite haunts appear to be the grassy prairies, that extend hundreds of miles without a break through Texas and Oregon, dotted everywhere with small patches of timber. As the eye wanders over the limitless tract of prairie, these small isolated belts and clumps of trees exactly resemble beautifully-wooded islands, studding a sea of waving grass. Here the prong-buck wanders in herds of from sixty to seventy; naturally shy, approaching them is not by any means an easy matter; on the least alarm the males give the shrill whistling snort, toss their graceful heads, sniff the air, stamp with their forefeet, then bound away like the wind; the herd circle round at first, then wheel up again in tolerable line, have another look, and, if apprehensive of danger, dash off, and seldom stop until safe from all risk of harm.

There are two methods of hunting them practised by the Indians, on horseback and on foot. If the former, three or four mounted savages, armed with bows, arrows, and lassos, approach from different points, so as to get a herd of antelopes between them on the open prairie. They then ride slowly round and round the herd, each time diminishing the circle: the terror-stricken beasts huddle closer and closer together, and

appear perfectly bewildered. When, by this manœuvre, the Indians have approached sufficiently near, each throws his unerring lasso, then shoots arrows at the flying herd. As many as six are often killed and caught at one circling.

On foot the crafty savage, getting the wind of the herd, crawls along the grass, and every now and then lies on his back, and elevates his two legs into the air. Attached to the heel of each mocassin is a strip of ermine-skin, which floats like a pennant. The antelopes soon notice it, stand, and look ; down go the heels, and on the Indian crawls ; and if the herd does not come towards him, he gets a little nearer. In a short time their curiosity tempts them to approach slowly and cautiously towards the two feet, which are performing every variety of strange evolution. Near enough, they too soon discover their error ; the twang of the string and whistling arrow, that goes up to the feather-end in the chest of the foremost male, warns the others to fly, and leave their leader and king a prey to the wily redskin.

We are on the sandy waste, and right well does it merit its name desert, for a more dismal barren wilderness cannot be imagined ; its surface is all pumice and cinders, with nothing growing

on it but a few sage-bushes and dwarfed junipers. Every step the animals make is fetlock-deep; and dust, that nearly chokes and blinds us, comes from every direction. On, and on, and on we go, but no change, no hope of water.

Just before dark—when I begin to think I have been guilty of an awful mistake, and brought needless misery on both men and animals—I push ahead of the train, in hope of finding water, for the guide is utterly lost. Suddenly I descry the tracks of the prong-buck in the sand; hope revives, water must be near at hand! Carefully I follow on their tracks, that lead down a sloping bank of scoria, and slags of lava, through a narrow gorge, with rocks on either side that look as if they had been burnt in a limekiln—to come out into a narrow valley, where the sight of trees, grass, and water makes my heart leap with delight.

Back I spur to meet the lagging train, toiling on, parched with thirst, blinded with dust; hungry, weary, and exhausted. I guide them to the valley, and at the sight of water, men and mules seem to gain new life, rush wildly towards it, plunge in, and drink as only the thirst-famished can. Unsaddle and let the mules feed for two hours, then light five fires, and keep them closely

herded, although I have but very little dread of farther pursuit. Supped on grilled antelope, and got a few hours' sleep.

May 23rd.—All safe; no sign of being followed. Off at dawn; fifteen miles more of this horrid waste, and we begin ascending a ridge of mountains, which I find is the watershed of the streams flowing into the Columbia on one side and into the Klamath river on the other; strike the headwaters of the Des Chutes or Fall river, and camp in a fine grassy prairie belted with pine—the *Pinus ponderosa*. Here I determine to remain two days, to allow resting-time for men and animals.

May 25th.—All wonderfully recruited; rest and good feeding soon repair a healthy body, be it man's or quadruped's. I stroll off with my gun, and observe that numbers of the pine-trees are completely studded with acorns, just as nails with large heads were driven into doors in olden days. I had seen a piece of the bark filled with acorns in San Francisco, and was there informed it was the work of a woodpecker, but, to tell the truth, thought I was being hoaxed; but here I am in the midst of dozens of trees, with acorns sticking out all over their trunks; it is no hoax, for I saw the birds that did it, and shot two of them. This singular acorn-storer is the Cali-

formian woodpecker (*Melanerpes formicivorus*), evidently of very social habits. They assemble in small flocks, climbing rapidly along the rough bark of the pitch-pine, rapping here and there, with their wedgelike beaks, to scare some drowsy insect; inducing it to rush out, to be nipped, or speared, with the barbed tongue, ere half-awake; others, sitting on the topmost branches of the oaks and pines, continually darted off after some fugitive moth or other winged insect, capturing it much in the fashion of the flycatchers. The harsh and discordant voice is made up for in beauty of plumage. A tuft of scarlet feathers crowns the head, and contrasts brilliantly with the glossy bottle-green of the back and neck; a white patch on the forehead joins, by a narrow isthmus of white, with a necklet of golden-yellow; the throat is dark-green, and the under-parts of a pure white.

As I look over these stores of acorns, I am at a loss to think for what purpose the birds place them in the holes. In Cassin's 'Birds of America' he quotes from Dr. Heerman and Mr. Kelly's 'Excursions in California.' Both writers positively state that these birds stow away acorns for winter provisions, and the latter that he has seen them doing it: 'I have frequently paused from my chopping to watch them with the acorns in their

bills, and have admired the adroitness with which they tried it at different holes, until they found one of its exact calibre.'

I have seen the acorns in the holes, and the birds that are said to put them there, and have no right to doubt the statements of other observers; but it seems strange to me, that I cannot find a single acorn exhibiting any evidence of being eaten during the winter. These were stored on the previous fall; winter has passed away, and yet not a seed has been eaten, as far as I can see. I opened the stomachs of the two birds I shot, but not a trace of vegetable matter was in either of them. Subsequently I killed and examined the stomachs of a great many specimens, but never detected anything save insect remains.

Does this woodpecker *ever* eat acorns? I think *not*. More than this, when the insects die, they go to sleep during the cold, snowy, biting winter months, the woodpeckers, like all other sensible birds, go southwards, and have no need to store up a winter supply, as do quasi-hibernating mammals. Then it occurred to me, that if they really do take the trouble to bore holes, a work of great time and labour, and into every hole carefully drive a *sound* acorn that they never

make any use of, it is simply idle industry. As a rule, birds are not such thriftless creatures. I had no opportunity of watching the birds in acorn-time—hence this storing is still to me a mystery that needs further explanation.

I came suddenly on a flock of yellow-headed blackbirds (*Xanthocephalus icterocephalus*), sitting on a clump of bushes skirting a small pool. As they sit amidst the bright-green foliage, they remind me of blossoms; the intense black of the body-plumage shows out so conspicuously against the orangelike yellow of the head, that the colours seem too defined for a bird's livery, and more like the freaks of colouring Nature indulges in when tinting orchideous flowers. I imagine this to be their utmost range northwards, for I never saw them after, although they are frequent visitors to Texas, Illinois, and Mexico. Strike the trail of a grizzly, follow it for some distance, but fail in coming up with my large-clawed friend.

May 26th.—I find I shall have to ferry the Des Chutes river. Send on four of my men ahead, to collect timber for a raft. Find, on arriving at the river-bank, that a heap of dry timber has been collected. With axes and an augur—and here let me advise all who travel with pack-

horses or mules never to go without a three-inch augur—we soon build a raft 12 feet long by $6\frac{1}{2}$ feet wide; the timber is fastened together with wooden trenails.

The stream makes a bend at this spot, and does not run quite so swiftly, about eighty yards wide, with a dry bank on the side we are, but swampy on the opposite. We launch our raft; she floats like a boat, make ropes fast to her, and stow a coil on board; with one man I commence crossing, paddling with rough oars hewn from a pine-branch. They pay-out rope as we near the opposite bank; twice we whirl round, and come very near being a wreck, but right again. We are over. Now we make fast our rope, and the men on the other side haul her back; and thus we tug her from side to side, heavily freighted; we have made a very successful crossing, neither losing nor damaging anything. The mules swam the river, and also got safely over.

May 27th.—Fine morning: made an early start; kept close along on the course of the river for about twenty miles, following a ridge lightly timbered. The opposite or east bank is an enormous mass of black basaltic rock, extending several miles in length. The top is like a table, reaching as far as one could see,

quite black, and not the vestige of a plant visible. The black expanse had exactly the appearance of a bed of rocks, over which the tide ebbed and flowed. Crossed a creek fifteen miles from camp, deep and swift, and about fifteen yards wide; five miles beyond this cross another creek, about half the size. Leave the timber and come out on a wide sandy kind of desert, covered with wild-sage and stunted juniper-trees, frightfully dusty, and most tiresome for the mules; no chance of camping until quite over it, which is twenty miles. After a weary march reach a creek, where I stop; a capital camping-ground, with fine grass and water. Passed close along the bases of the Three Sisters, lofty mountains, at this time covered with snow. Saw a great many abandoned lodges, but no Indians. The sandy places were quite alive with the Oregon horned toad (*Tapaya Douglassii*), which is a lizard really very harmless, and particularly ugly. Every stream too was thronged with beaver.

May 28th.—Mules all in at 4 A.M. Got off in good time: weather not nearly so cold. Looked over the creek, but saw no gold, but any quantity of beaver-workings; trees four feet round had been cut down by them. Passed through a tract of lightly-timbered land and open grassy

valleys; crossed a small creek about eight miles from camp, descending rapidly all the way for about eighteen miles.

Came on to the top of a high basaltic mountain, that seemed to offer an almost perpendicular descent into a deep gorge or *cañon*. I rode right and left, but discovering no better place, down we went; how the mules managed to scramble to the bottom without falling head over heels I know not, but we got safely down. I believe it would have been utterly impossible to have got up over it a second time. Through the gorge ran a large swift stream, called by the Indians Wychus creek, in which we found a good fording-place and got over it; safely camped about a mile below the place we forded. The camp was completely shut in by almost vertical cliffs of basalt and tuffa, covered thickly with what I take to be ancient river-drift; the cliffs were, I should say, quite 100 feet high.

The great black *butte* down which we scrambled was a volcano, and an active one too, not a very long time ago; streams of lava, just like slag, that had run in a molten state as if from out a huge glass furnace, reached from its summit to its base; and the red cindery earth, on either side this congealed stream, told plainly

enough how fearfully hot it must have been. One would imagine this district was entirely volcanic, the great desert-waste we crossed being composed of pumice, scoria, and ashes. Perhaps these lesser hills were safety-valves to the more conspicuous mountains in the coast-range of British Columbia and Washington Territory—Mounts Baker, Reiney, St. Helens, and others.

Several pillars, composed of a kind of conglomerate, quite away from all the surrounding rocks, stand as if man had hewn or rather built them—ghostly obelisks, that have a strange and unusual look. I suppose the portions that once joined them to the mass, from which they were detached, must have been crumbled off by Time's fingers, and these solitary pedestals left as records. Round them, too, were scores of tiny heaps of boulders, built, as I am informed, by the Snake Indians, who suppose these pillars are the remains of spirits that have been turned into stone; but for what object they really pile up these little altars I could never discover, though the Indians tell you as a powerful '*medicine*'; but who can say what that means?

May 29th.—All night it rained in torrents, and I do not think I ever saw so dark a night; the rain put out all our fires, and I could neither see

men or mules, although close to them. Got the mules together at 7 A.M., but did not make an early start, in consequence of the men being tired from want of sleep: we managed to start at eight o'clock. Our first task was to get out of the gorge. It was a most tedious and even dangerous job, for the ground was loose, and constantly broke away from under the mules' feet, but at last we managed to scramble to the top.

For twenty miles farther it was a continued series of uphill and downhill, all loose basaltic ground, and very hard to travel over. Descending a long sandy hill we came to an Indian reserve (the Warm Spring reservation); and we encamp. The house is a large quadrangular building of squared blocks, loopholed for shooting through. Six white men live here, and the Indians on the reservation are the Des Chutes tribe; they cultivate a small quantity of ground very badly. All hands are in a great state of ferment. A band of Snake Indians have just made a raid on the reservation, driven off seventeen head of stock, and are hourly expected to return. This is cheering, considering I must pass the night here. But, luckily, no Indians came.

May 30th.—I should be seventy miles from the camp I am to join; start with one man as a

companion at three o'clock in the morning. The silver stream of light from the unclouded moon illumines the trail we follow as brightly as sunshine. The mules are to follow. As day dawns an open plain is seen, spreading far away right and left, and along it a horseman gallops towards us.

As he nears I make him out to be an Indian on a skewballed horse. We stop and parley, and I find he is a Snake scout; both horse and rider are splendid specimens of their kind. A circle of eagle's feathers fastened to the skin of the ermine surrounds his head, and long raven black hair covers his neck: a scarlet blanket, elaborately beaded, hangs from his shoulders; a broad wampum-belt contains his knife and powder-horn, and in his right hand he bears a rifle. But very little paint daubs his shining-red skin, through which every muscle stands out as if cast in bronze; he is a handsome savage, if there ever was one. As we ride in opposite directions, I cannot help thinking that men and mules will stand but little chance if all the Snakes are like to this sable warrior. Reached a cabin at the Tye creek after doing forty-five miles, where we remained for the night.

May 31st.—Ride in amidst the tents of the Commission, anxiously awaiting my arrival. The

following day men and mules arrive safely. So ended my journey through the wilder part of Oregon, having accomplished a hazardous, wearisome journey, making my way a distance of several hundred miles without any trails, or, if any, simply trails used by Indians to reach their hunting or fishing-grounds; sleeping during the whole time in the open air, a saddle my only pillow. Apart from the anxiety, harass, and want of rest, and the necessity of guarding against the hostile Klamaths, to save the mules and our scalps, we all enjoyed the journey thoroughly, not even a cold resulting from the exposure.

CHAPTER XII.

SHARP-TAILED GROUSE — BALD-HEADED EAGLE — MOSQUITOS —
LAGOMYS MINIMUS (NOV. SP.) — HUMMINGBIRDS — UROTRICHUS.

THE SHARP-TAILED GROUSE (*Pediocætes Phasianellus*, Baird; *Tetrao Phasianellus*, Linn.; *Centrocercus Phasianellus*, Jardine; *Phasianus Columbianus*, Ord.)—*Specific characters*: The tail consists of eighteen feathers—prevailing colours black, white, and umber-yellow; the back marked with transverse bars, the wings with round conspicuous white spots—under pure white; the breast and sides thickly marked with V-shaped blotches of dark-brown; length about 18·00; wing, 8·50; tail, 5·23 inches.

This beautiful bird is alike estimable, whether we consider him in reference to his field qualities (therein being all a grouse ought to be, rising with a loud rattling whirr, and going off straight as an arrow, lying well to dogs, and frequenting open grassy prairies), or viewed as a table dainty,



THE SHARP-TAILED GROUSE
(*Pollocastes phasianellus*).



when bowled over and grilled. Though his flesh is brown, yet for delicacy of flavour—game in every sense of the word—I'll back him against any other bird in the Western wilds. This grouse appears to replace the Prairie-hen (*Cupidonia cupido*) on all the prairies west of the Rocky Mountains. By the fur-traders it is called the 'spotted chicken'; for all grouse, by the traders and half-breeds, are called chickens! and designated specifically by either habit or colour—such as blue chickens, wood chickens, white chickens (ptarmigan), &c. &c.; the *skis-kin* of the Kootanie Indians.

The tail is cuneate and graduated, and about two-thirds the length of the wing; the central pair, considerably longer than the rest, terminate in a point—hence the name *sharp-tailed*.

The singular mixture of colours (white, black, and brownish-yellow), the dark blotches, transverse bars, and V-shaped marks of dark-brown, exactly resemble the ground on which the bird is destined to pass its life. The ochreish-yellow angular twigs and dead leaves of the *Artemisia*, or wild-sage; the sandy soil, dried and bleached to a dingy-white; the brown of the withered bunch-grass; the weather-beaten fragments of rock, clad in liveries of sombre-coloured lichens, admirably

harmonise with the colours in which Nature has wisely robed this feathered tenant of the wilderness.

Often, when the sharp crack of the gun, and the *ping* of the fatal leaden messengers, has rung the death-peal of one of these prairie-chiefs, I have watched the whirring wing drop powerless, and the arrowy flight stop in mid-career, and, with a heavy thud, the bird come crashing down. Rushing to pick him up, and keeping my eye steadily on the spot where he fell, I have felt a little mystified at not seeing my friend: here he fell, I am quite sure; so I trudge up and down, circle round and round, until a slight movement—an effort to run, or a dying struggle—attracts my attention, and then I find I have been the whole time close to the fallen bird. But so closely do the back and outspread wings resemble the dead foliage and sandy soil, that it is almost impossible for the most practised eye to detect these birds when crouching on the ground; and there can be no doubt that it as effectually conceals them from birds of prey.

This bird is abundantly distributed on the western slope of the Rocky Mountains, ranging right and left of the Boundary-line, the 49th parallel of north latitude. It is particularly abundant

on the tobacco-plains near the Kootanie river, round the Osoyoos lakes, and in the valley of the Columbia.

I have never seen this grouse on the western side of the Cascade range. This bird is also found in the Red River settlements, in the north of Minnesota, as well as on the shores of Hudson's Bay, and on the Mackenzie river. Mr. Ross notes it as far north as the Arctic Circle.

Of the different species of grouse I met with in my rambles (described in vol. ii.) not one has come so often under my observation as this, the sharp-tailed grouse. Its favourite haunt is on open grassy plains,—in the morning keeping itself concealed in the thick long grass, but coming in about midday to the streams to drink, and dust itself in the sandy banks; it seldom goes into the timber, and, if it does, always remains close to the prairie, never retiring into the depths of the forest.

They lay their eggs on the open prairie, in a tuft of grass, or by the foot of a small hillock; nesting early in the spring, and laying from twelve to fourteen eggs. The nest is a hole scratched out in the earth, a few grass-stalks and root-fibres laid carelessly and loosely over the bottom; the eggs are of a dark rusty-brown, with small splashes

or speckles of darker brown thickly spattered over them.

After nesting-time, they first appear in coveys or broods about the middle of August ; the young birds are then about three parts grown, strong on the wing, and afford admirable sport. At this time they live by the margins of small streams, where there is thin timber and underbrush, with plenty of sandy banks to dust in. About the middle of September and on into October they begin to pack ; first two or three coveys get together, then flock joins flock, until they gradually accumulate into hundreds. On the first appearance of snow they begin to perch, settling on high dead pine-trees, the *dead* branches being a favourite locality ; or, should there be any farms, they pitch round on the top of the snake-fences. At the Hudson's Bay trading-post at Fort Colville there were large wheat-stubbles ; in these, after the snow fell, they assembled in vast numbers. Wary and shy they are now, and most difficult to get at ; the cause being, I apprehend, the snow rendering every moving thing so conspicuous, it is next to impossible for dogs to hunt them.

Their food in the summer consists, principally of berries — the snowberry (*Symphoricarpus*

racemosus), and the bearberry (*Arctostaphylos uva-ursi*). The leaves of this latter plant are used to a great extent, both by Indians and traders, to mix with or use instead of tobacco, and called *kini-kinick*; the leaves being dried over the fire, and rubbed up in the hand to powder, and smoked in a pipe. The wild roseberries (*Rosa blanda* and *Rosa mirantha*), and many others, usually designated huckleberries, constitute the food generally consumed by these birds during summer and autumn; although I have often found quantities of wheat-grains and larvæ of insects, grass-seeds, and small wild flowers in their crops. Their thickly-feathered feet enable them to run upon the snow with ease and celerity, and they dig holes and burrow underneath it much after the fashion of the ptarmigan.

During the two winters we spent at Colville, flocks of these birds congregated about the corn-stacks and hayricks at our mule-camp, and at the Hudson's Bay trading-post, Fort Colville. The temperature at that time was often down to 29° and 30° below zero, and the snow three feet deep; yet these birds did not at all appear to suffer from such intense cold, and were strong, wild, and fat during the entire winter, which

lasted from October until near April before the snow entirely cleared.

In this valley (the Colville valley) the Commissioner and myself had, I think, as brisk and nice a bit of shooting as I ever enjoyed. If I remember aright, it was towards the end of September, and the birds had packed. We rode down one clear bright morning, about six miles, to the Horse-Guards. Do not at once hastily imagine any analogy between Colville valley and Whitehall. The heavy man, with his heavy boots, heavy sword, heavy dress, heavy walk, and heaviest of all heavy horses—so conspicuous a feature in our London sights—is represented here by the genuine savage, thin and lissom as an eel; his equipment a whip, a lasso, a scalping-knife, and sometimes a trade-gun; a pad his saddle, and the bands of horses, some two hundred in number, his charge. A stream of cold clear water rambles quietly down the hillside; and as the hills are thickly dotted with bunch-grass, affording most glorious pasturage, the Hudson's Bay fort horses are always pastured here, and guarded by Indians; hence comes the name—'the Horse-Guards.'

The Colville valley is, roughly speaking, about thirty miles long, the hills on one side being

densely studded with pine-trees, and on the other quite clear of timber, but thickly clothed up to their rounded summits with the bunch-grass. This is a peculiar kind of grass, that grows in tufts, and its fattening qualities are truly wonderful.

The little stream at the Horse-Guards has on either side of it a belt of thin brush, and in this, and in the long grass close to the stream, we found the sharp-tailed grouse. There were hundreds of them—up they went, and, right and left, down they came again! It might have been the novelty of the scene, causing an undue anxiety and excitement, or perhaps it was the liver, or powder, or something else—who knows what?—but this I do know, that neither of us shot our best, but we made a glorious bag nevertheless. They rise with a loud rattling noise, and utter a peculiar cry, like ‘chuck, chuck, chuck,’ rapidly and shrilly repeated. On first rising the wings are moved with great rapidity, but after getting some distance off they sail along, the wings being almost quiescent.

They pair very early in the spring, long before the snow has gone off the ground, and their love-meetings are celebrated in a somewhat curious fashion. By the half-breeds and fur-traders these festivities are called chicken or pheasant dances.

I was lucky enough to be present at several of these balls whilst at Fort Colville. Their usual time of assembling is about sunrise, and late in the afternoon; they select a high round-topped mound; and often, ere the fair are wooed and won, and the happy couple start on their domestic cares, the mound is trampled and beaten bare as a road.

I had often longed to be present at one of these chicken-dances; and it so happened that, riding up into the hills early one spring morning, my most ardent wishes were fully realised. The peculiar 'chuck-chuck' came clear and shrill upon the crisp frosty air, and told me a dance was afoot. I tied up my horse and my dog, and crept quietly along towards the knoll from whence the sound appeared to come. Taking advantage of some rocks, I weazled myself along, and, without exciting observation, gained the shelter of an old pine-stump close to the summit of a hillock; and there, sure enough, the ball was at its height.

Reader, can you go back to the days of your first pantomime, your first Punch-and-Judy, or bring to your remembrance the fresh, bounding, joyous delight that you felt in the days of your youth, when you had before your eyes some long

and deeply-wished-for novelty? If you can, you will be able to imagine my childish pleasure when looking for the first time on a chicken-dance. There were about eighteen or twenty birds present on this occasion, and it was almost impossible to distinguish the males from the females, the plumage being so nearly alike; but I imagined the females were the passive ones. The four birds nearest to me were head to head, like gamecocks in fighting attitude—the neck-feathers ruffed up, the little sharp tail elevated straight on end, the wings dropped close to the ground, but keeping up by a rapid vibration a continued throbbing or drumming sound.

They circled round and round each other in slow waltzing-time, always maintaining the same attitude, but never striking at or grappling with each other; then the pace increased, and one hotly pursued the other until he faced about, and *tête-à-tête* went waltzing round again; then they did a sort of 'Cure' performance, jumping about two feet into the air until they were winded; and then they strutted about and 'struck an attitude,' like an acrobat after a successful tumble. There were others marching about, with their tails and heads as high as they could stick them up, evidently doing the 'heavy swell;' others, again, did not

appear to have any well-defined ideas what they ought to do, and kept flying up and pitching down again, and were manifestly restless and excited—perhaps rejected suitors contemplating something desperate. The music to this eccentric dance was the loud ‘chuck-chuck’ continuously repeated, and the strange throbbing sound produced by the vibrating wings. I saw several balls after this, but in every one the same series of strange evolutions were carried out.

In reference to this bird’s adaptability to acclimatisation in our own country, it appears to me to be most admirably fitted for our hill and moorland districts. It is very hardy, capable of bearing a temperature of 30° to 33° below zero; feeds on seeds, berries, and vegetable matter—in every particular analogous to what it could find in our own hill-country; a good breeder, having usually from twelve to fourteen young at a brood; nests early, and would come to shoot about the same time as our own grouse. Snow does not hurt them in the slightest degree; they burrow into it, and feed on what they can find underneath it. The two specimens in the British Museum I shot in the Colville valley; they are male and female, in winter plumage; and anyone, who may feel an interest in getting these birds

brought home, may there see for himself what fine handsome creatures they are.

But then comes the question—how are they to be obtained, and how brought to England? I do not imagine it would be a very difficult or expensive matter; the young birds in May could be easily obtained, at any point up the Columbia river, by employing the Indians to bring them to the riverside; and once on board steamer, they could be as easily fed as fowls. The great difficulty I have always had is in bringing the young birds from the interior to a vessel; they always die when transported on the backs of animals, however carefully packed. The continued jerking motion given to birds packed on the back of a mule or horse as he walks along has, according to my experience, been the sole cause of their dying ere you could reach water-carriage; but the fact of their being so close to water as they are along the Columbia river, would render their being brought home a very easy task.

THE BALD-HEADED EAGLE (*Haliaeetus leucocephalus*) is seen but seldom, as during its breeding-time it retires into the hills, and usually chooses a lofty pine as its nesting-place. Two of them had a nest near the Chilukweyuk lake, which was quite inaccessible, of immense size,

and built entirely of sticks—the same nest being invariably used year after year by the same pair of birds. Their food consists mainly of fish, and it is a curious sight to watch an eagle plunge into the water, seize a heavy salmon, and rise with it without any apparent difficulty. Both the osprey and bald-headed eagle fish with their claws, never, as far as I have observed them, striking at a fish with the beak; during winter they collect, young and old together, round the Sumass lake; and as the cold becomes intense, they sit three and four on the limb of a pine-tree, or in a semi-stupid state, all their craft and courage gone, blinking and drowsy as an owl in daytime.

I have often, when walking under the trees where these half-torpid monarchs of the air sit side by side, fired and knocked one out from betwixt its neighbours, without causing them the slightest apparent alarm; three I picked up one morning frozen stiff as marble, having fallen dead from off their perch.

Why birds so powerfully winged should prefer to remain where the winters are sufficiently intense to freeze them to death, rather than go southward, where food is equally abundant, is a mystery I am unable to explain. Towards the

fall of the year, when the hunting and fishing-grounds of the Old-man (*Sea-la-ca*, as the Indians designate the eagle, on account of its *white head*) grow scant of game, hunger prompts them to be disagreeably bold. Constantly a fat mallard, that I had taken a vast amount of trouble to stalk, was pounced upon by a watchful eagle, and borne off, ere the report of my gun was lost in the hills, or the smoke had cleared away; indeed, I have sometimes given the robber the benefit of a second barrel, as punishment for his thievery. Numberless ducks have been lost to me in this way. This eagle is by far the most abundant of the falcon tribe in British Columbia, and always a conspicuous object in ascending a river; he is seated on the loftiest tree or rocky pinnacle, and soars off circling round, screaming like a tortured demon, as if in remonstrance at such an impudent intrusion into its solitudes. The adult plumage is not attained until the fourth year from the nest.

MOSQUITOS (*Culex pinguis*, nov. sp.)—Reader, if you have never been in British Columbia, then, I say, you do not know anything about insect persecution; neither can you form the faintest idea of the terrible suffering foes so seemingly insignificant as the bloodthirsty horse-

fly (*Tabanus*), the tiny burning fly (beulot or sand-fly of the trappers), and the well-known and deservedly-hated *mosquito*, are capable of inflicting.

A wanderer from my boyhood, I have met with these pests in various parts of our globe—in the country of Czernomorzi, among the Black Sea Cossacks, on the plains of Troy, up on Mount Olympus, amid the gorgeous growths of a tropical forest, where beauty and malaria, twin brothers, walk hand-in-hand—away in the deep dismal solitudes of the swamps on the banks of the Mississippi, on the wide grassy tracts of the Western prairies, and on the snow-clad summits of the Rocky Mountains.

Widely remote and singularly opposite as to climate as are these varied localities, yet, as these pests are there in legions, I imagined that I had endured the maximum of misery they were capable of producing. I was mistaken; all my experience, all my vaunted knowledge of their numbers, all I had seen and suffered, was as nothing to what I subsequently endured. On the Sumass prairie, and along the banks of the Fraser river, the mosquitos are, as a Yankee would say, 'a caution.'

In the summer our work, that of cutting the

Boundary-line, was along the low and comparatively flat land intervening between the seaboard and the foot of the Cascade Mountains. Our camp was on the Sumass prairie, and was in reality only an open patch of grassy land, through which wind numerous streams from the mountains, emptying themselves into a large shallow lake, the exit of which is into the Fraser by a short stream, the Sumass river.

In May and June this prairie is completely covered with water. The Sumass river, from the rapid rise of the Fraser, reverses its course, and flows back into the lake instead of out of it. The lake fills, overflows, and completely floods the lower lands. On the subsidence of the waters, we pitched our tents on the edge of a lovely stream. Wildfowl were in abundance; the streams were alive with fish; the mules and horses revelling in grass kneedeep—we were in a second Eden!

We had enjoyed about a week at this delightful camp, when the mosquitos began to get rather troublesome. We knew these most unwelcome visitors were to be expected, from Indian information. I must confess I had a vague suspicion that the pests were to be more dreaded than we were willing to believe; for the crafty redskins

had stages erected, or rather fastened to stout poles driven like piles into the mud at the bottom of the lake. To these large platforms over the water they all retire, on the first appearance of the mosquitos.

In about four or five days the increase was something beyond all belief, and really terrible. I can convey no idea of the numbers, except by saying they were in dense clouds truly, and not figuratively, a thick fog of mosquitos. Night or day it was just the same; the hum of these bloodthirsty tyrants was incessant. We ate them, drank them, breathed them; nothing but the very thickest leathern clothing was of the slightest use as a protection against their lancets. The trousers had to be tied tightly round the ankle, and the coat-sleeve round the wrist, to prevent their getting in; but if one more crafty than the others found out a needle-hole, or a thin spot, it would have your blood in a second. We lighted huge fires, fumigated the tents, tried every expedient we could think of, but all in vain. They seemed to be quite happy in a smoke that would stifle anything mortal, and, what was worse, they grew thicker every day.

Human endurance has its limits. A man can-

not stand being eaten alive. It was utterly impossible to work ; one's whole time was occupied in slapping viciously at face, head, and body, stamping, grumbling, and savagely slaughtering hecatombs of mosquitos. Faces rapidly assumed an irregularity of outline anything but consonant with the strict lines of beauty ; each one looked as if he had gone in for a heavy fight, and lost. Hands increased in size with *painful* rapidity, and—without intending a slang joke—one was in a *k-nobby* state from head to heel.

The wretched mules and horses were driven wild, racing about like mad animals, dashing into the water and out again, in among the trees ; but, go where they would, their persecutors stuck to them in swarms. The poor dogs sat and howled piteously, and, prompted by a wise instinct to avoid their enemies, dug deep holes in the earth ; and backing in lay with their heads at the entrance, whining, snapping, and shaking their ears, to prevent the mosquitos from getting in at them.

There was no help for it—our camp had to be abandoned ; we were completely vanquished and driven away—the work of about a hundred men stopped by tiny flies. Our only chance of escape was to retire into the hills, and return to complete

our work late in the autumn, when they disappear. Hard wind is the only thing that quells them; but it simply drives them into the grass, to return on its lulling, if possible, more savagely hungry. Quaint old Spenser knew this; he says, speaking of gnats:—

No man nor beast may rest or take repast
For their sharp sounds and noxious injuries,
Till the fierce northern wind with blustering blast
Doth blow them quite away, and in the ocean cast.

My notebook, as I open it now, is a mausoleum of scores of my enemies; there they lay, dry and flat; round some of them a stain of blood tells how richly they merited their untimely end.

One thing has always puzzled me in the history of these ravenous cannibals—what on earth can they get to feed on, when there are no men or animals? I brought home specimens, of course; and I am by no means sure I feel any great pleasure in finding my foe to be a new species, but it is, and named *Culex pinguis*, because it was fatter and rounder than any of its known brethren.

The habits of this new mosquito are, in every detail, the same as all the known species. The female lays her eggs, which are long and oval in shape, in the water; then aided by her hind-legs,

she twists about the eggs, and tightly glues them together, into a very beautiful little boat-shaped bundle, that floats and drifts about in the water. In sunny weather the eggs are speedily hatched, and the larvæ lead an aquatic life. They are very active, diving to the bottom with great rapidity, and as quickly ascending to the surface to breathe; the respiratory organs being situated near the tail, on the eighth segment of the abdomen, they hang, as it were, in the water, head downwards. After shifting the skin three or four times, they change into the pupa form, in which state they move about, even more actively than before, aided by the tail, and two organs like paddles, attached to it. In this stage of their existence they never feed (I only wish they would always remain in this harmless condition); and although they still suspend themselves in the water, the position is reversed, the breathing organs being now placed on the chest.

The final change to the perfect or winged state is most curious, and well worth careful attention. The pupa-case splits from end to end; and, looking moist and miserable, with crumpled wings, the little fly floats on its previous home, an exquisite canoe of Nature's own contriving. A breeze of wind sufficient to

ripple the water is fatal to it now, as shipwreck is inevitable; but if all is calm and conducive to safety, the little fly dries, the wings expand, it inhales the air, and along with it strength and power to fly; then bidding goodbye to the frail barque, wings its way to the land, and begins a war of persecution.

Mosquitos never venture far over the water after once quitting their skin-canoe: this fact the wily savage has taken advantage of. During 'the reign of terror' the Indians never come on shore if they can help it; and if they do, they take good care to flog every intruder out of the canoes before reaching the stage.

These stages, each with a family of Indians living on them, have a most picturesque appearance. The little fleet of canoes are moored to the poles, and the platform reached by a ladder made of twisted cedar-bark. Often have I slept on these stages among the savages, to avoid being devoured. But I am not quite sure if one gains very much by the change: in the first place, if you are restless, and roll about in your sleep, you stand a very good chance of finding yourself soused in the lake. The perfumes—varied but abundant—that regale your nose are not such as are wafted from 'tropic isles' or

'Araby the blest.' I shall not shock my fair readers with any comparison—you must imagine it is not agreeable. Dogs also live on these platforms; for the Indian dog is always with his master, sharing bed as well as board. These canine favourites are not exempt from persecutors; like the giant of old, they at once 'smell the blood of an Englishman,' and will have some; but, after all, the night steals away, you know not how, until the dawn, blushing over the eastern hill-tops, rouses all the dreaming world—except mosquitos, that never sleep.

On the eastern side of the Cascades the scenery and general physical condition of the country materially changes, and the *Tabanus* and burning-fly become the ruling persecutors.

Lagomys minimus (Lord, sp. nov.)—The Commissioner, myself, a few men, and a small train of pack-mules, set out to visit some of the stations on the Boundary-line, east of the Cascades. Our route lay along the valley of the Shimilkameen river, to strike Ashtnolow, a tributary that led up into the mountains, the course of which we were to follow as far as practicable. We had a delightful trip, through a district indescribably lovely.

There is a wild and massive grandeur about

the eastern side of the Cascades, unlike the scenery of the west or coast slope, which is densely wooded. Here it was like riding through a succession of parks, covered with grass and flowers of varied species.

We reached the junction of the two streams, and camped, just as the sun, disappearing behind the western hills, tinted with purple twilight the ragged peaks of the rocks that shut us in on every side. Scarce a sound of bird or beast disturbed the silence of the forest, and save the babble of the stream, as it rippled over the shingle, all nature was soon hushed in deathlike sleep. I could dimly make out in the fading light the grim hills we had to climb, towering up like mighty giants; the clear white snow, covering their summits, contrasted strangely with the sombre pine-trees, thickly covering the lower portion of the mountains.

We had a stiff climb before us, and my hopes were high in expectation of bowling over big-horn (*Ovis montana*) and ptarmigan. For some distance we scrambled up the sides of the brawling torrent, whose course, like true love, was none of the smoothest, being over and among vast fragments of rock, that everywhere covered the hillside. From amidst these relics of destruc-

tion grew the Douglas pine and ponderous cedar (*Thuja gigantea*). Here the ascent was easy enough, but on reaching a greater altitude, the climbing became anything but a joke.

We at last reached a level plateau near the summit, and lay down on the soft mossy grass, near a stream that came trickling down from the melting snow.

Close to my couch was a talus of broken granite, that Old Time and the Frost King between them had crumbled away from a mass of rocks above. As I contemplated this heap of rocks, a cry like a plaintive whistle suddenly attracted my attention; it evidently came from amongst the stones. I listened and kept quiet. Again and again came the whistle, but nowhere could I see the whistler. A slight movement at length betrayed him, and I could clearly make out a little animal sitting bolt upright, like a begging-dog, his seat a flat stone in the middle of the heap.

I had a load of small-shot in one barrel, intended for ptarmigan; raising my gun slowly and cautiously to my shoulder, I fired as I lay on the ground. The sharp ringing crack as I touched the trigger—the first, perhaps, that had ever awoke the echoes of the mountain—was the death-knell of the poor little musician.

I picked him up, and imagine my delight when for the first time I held a new *Lagomys* in my hand. Having made out what he was, the next thing to be done was to watch for others—to find out what they did, and how they passed the time in their stony citadel. I had not long to wait; they soon came peeping slyly out of their hiding-places, and, inferring safety from silence, sat upon the stones and cheerily chorused to each other. The least noise, and the whistle was sounded sharper and more shrill—the danger-signal, when one and all took headers among the stones.

I soon observed they were busy at work, carrying in dry grass, fir-fronds, roots, and moss, and constructing a nest in the clefts between the stones, clearly for winter-quarters. The nests were of large size, some of them consisting of as much material as would fill a good-sized basket. One nest was evidently the combined work of several little labourers, and destined for their joint habitation.

There were no provisions stored away, neither do I think they garner any for winter use, but simply hybernate in the warm nest; which, of course, is thickly covered with snow during the

intense cold of these northern latitudes, thus more effectually preventing radiation and waste of animal heat. Their food consists entirely of grass, which they nibble much after the fashion of our common rabbit. They never burrow or dig holes in the ground, but pass their lives among the loose stones. Who can fail to trace the evidence of Divine care in colouring the fur of this defenceless creature in a garb exactly resembling the grey lichen-covered fragments amongst which he is destined to pass his life? So closely does the animal approximate in appearance to an angular piece of rock when sitting up, that unless he moves it takes sharp eyes to see him; and the cry or whistle is so deceptive that I imagined it far distant, when the animal was close to me.

The species described and figured by Sir John Richardson—F.B.A., plate 19, *Lepus* (*Lagomys*) *princeps*, the little Cheif Hare—I first saw at Chilukweyuk lake, and next on the trail leading from Fort Hope, on the Fraser river, to Fort Colville. The little fellows were in a narrow gorge, as well as among loose stones. It was about the same date as in the preceding year that I had seen *Lagomys minimus* making its nest; but here

not a trace of nest could I see, nor any evidence of an attempt to make one. I soon after returned again by the same trail. The snow having now fallen to the depth of about six inches, completely covering up the rocks and stones, all the animals had disappeared; and although I searched most carefully, there was not a hole or track in the snow, to show they had ever left their quarters to feed or wander about.

As it was quite impossible a nest could have been made in the interim, it is perfectly certain they hibernate in holes without a nest; whereas *Lagomys minimus*, living at a much greater altitude, makes a nest to sleep through the winter.

Lagomys minimus (Lord, sp. nov.).—SP. CHAR.: Differs from *Lepus* (*Lagomys*) *princeps* of Sir J. Richardson (F.B.A., vol. i. p. 227, pl. 19) in being much smaller. Predominant colour of back dark-grey, tinged faintly with umber-yellow, —more vivid about the shoulders, but gradually shading off on the sides and belly to dirty-white; feet white, washed over with yellowish-brown; ears large, black inside, the outer rounded margin edged with white; eye very small, and intensely black; whiskers long, and composed of about an equal number of white and black hairs.

Measurement: Head and body, $6\frac{1}{2}$ inches; head,

2 inches; nose to auditory opening, $1\frac{1}{4}$ inch; height of ear from behind, 1 inch.

The skull differs in being generally smaller; the cranial portion of the skull in its superior outline is much narrower and smoother. The nasal bones are shorter and broader, and rounded at their posterior articulation, instead of being deeply notched, as in *L. princeps*. Distance from anterior molar to incisors much less; auditory bullæ much smaller. Incisors shorter and straighter, and very deeply grooved on the anterior surface. Molars smaller, but otherwise similar in form. Length of skull, $1\frac{1}{4}$ inch.

General differences from *Lagomys princeps*:—First, in being smaller, $1\frac{1}{2}$ inch shorter in total length; the ear, measured from behind, $\frac{1}{4}$ inch shorter; the colour generally darker, especially the lower third of the back. Secondly, in the structural differences of the skull; for although these differences are not prominent or well-defined, yet they are unquestionable specific variations. Thirdly, in the habit of constructing a nest of hay for the winter sleep, and in living at a much greater altitude.

There is a strange indescribable delight in discovery, and in finding animals for the first time in their native haunts, animals that before one had

vaguely heard or only read of; thus digging, as it were, from Nature's exhaustless mine, fresh wonders of Divine handiwork on which eye had not before gazed.

Hummingbirds. — Hummingbirds, and the wild tangled loveliness of tropical vegetation, appear to be so closely linked together, that we are apt to think the one essential to the existence of the other.

We naturally (at least I did in my earlier days) associate these tiniest gems of the feathered creation with glowing sunshine, gorgeous flowers, grotesque orchids—palms, plaintains, bananas, and blacks. This is all true enough, and if we take that large slice of the American continent betwixt the Amazon, the Rio Grande, and the Gila (embracing Guiana, New Granada, Central America, Mexico, and the West Indian islands), as the home of hummingbirds, we shall pretty truthfully define, what is usually assumed to be, the geographical range of this group—a group entirely confined to America. Within the above limits, the great variety of species, the most singular in form and brilliant in plumage, are met with.

Gazing on these gems of the air, one would suppose that Nature had exhausted all her skill in lavishly distributing the richest profusion of



NORTH-WESTERN HUMMING-BIRDS.



colours, and in exquisitely mingling every imaginable tint and shade, to adorn these diminutive creatures, in a livery more lustrously brilliant than was ever fabricated by the loom, or metal-worker's handicraft.

But away from the tropics and its feathered wonders, to the wild solitudes of the Rocky Mountains,—it is there I want you in imagination to wander with me, and to picture to yourself, which you can easily do if you possess a naturalist's love of discovery, the delight I experienced when, for the first time, I saw humming-birds up in the very regions of the 'Ice King.'

Early in the month of May, when the sun melts down the doors of snow and ice, and sets free imprisoned nature, I was sent ahead of the astronomical party employed in making the Boundary-line to cut out a trail, and bridge any streams too deep to ford. The first impediment met with was at the Little Spokane river,—little only as compared with the Great Spokane, into which it flows. The larger stream leads from the western slope of the Rocky Mountains, and flows on to join the Columbia.

It was far too deep to be crossed by any expedient short of bridging; so a bridge had to be built, an operation involving quite a week's

delay. The place chosen, and the men set to work, my leisure time was devoted to collecting.

The snow still lingered in large patches about the hollows and sheltered spots. Save a modest violet or humble rock-blossom, no flower had ventured to open its petals, except the brilliant pink *Ribes*, or flowering currant, common in every English cottage-garden.

Approaching a large cluster of these gay-looking bushes, my ears were greeted with a sharp thrum—a sound I knew well—from the wings of a hummingbird, as it darted past me. The name by which these birds are commonly known has arisen from the noise produced by the wings (very like the sound of a driving-belt used in machinery, although of course not nearly so loud), whilst the little creature, poised over a flower, darts its slender beak deep amidst the corolla—not to sip nectar, in my humble opinion, but to capture drowsy insect revellers, that assemble in these attractive drinking-shops, and grow tipsy on the sweets gratuitously provided for them. Soon a second whizzed by me, and others followed in rapid succession; and, when near enough to see distinctly, the bushes seemed literally to gleam with the flashing colours of swarms (I

know no better word) of hummingbirds surrounding the entire clump of *Ribes*.

‘From flower to flower, where wild bees flew and sung,
As countless, small, and musical as they
Showers of bright hummingbirds came down, and plied
The same ambrosial task with slender bill,
Extracting honey hidden in those bells
Whose richest blossoms grew pale beneath their blaze,
Of twinkling winglets hov’ring o’er their petals,
Brilliant as rain-drops when the western sun
Sees his own miniature beams in each.’

Seating myself on a log, I watched this busy assemblage for some time. They were all male birds, and two species were plainly discernible. Chasing each other in sheer sport, with a rapidity of flight and intricacy of evolution impossible for the eye to follow—through the bushes, and over the water, everywhere—they darted about like meteors. Often meeting in mid-air, a furious battle would ensue; their tiny crests and throat-plumes erect and blazing, they were altogether pictures of the most violent passions. Then one would perch himself on a dead spray, and leisurely smooth his ruffled feathers, to be suddenly rushed at and assaulted by some quarrelsome comrade. Feeding, fighting, and frolicking seemed to occupy their entire time.

I daresay hard epithets will be heaped upon me,—cruel man, hard-hearted savage, miserable destroyer, and similar epithets,—when I confess to shooting numbers of these burnished beauties. Some of them are before me at this moment as I write; but what miserable things are these stuffed remains, as compared to the living bird! The brilliant crests are rigid and immoveable; the throat-feathers, that open and shut with a flash like coloured light, lose in the stillness of death all those charms so beautiful in life; the tail, clumsily spread, or bent similar to the abdomen of a wasp about to sting, no more resembles the same organ in the live bird,—than a fan of peacock's feathers is like to the expanded tail of that bird when strutting proudly in the sun.

It is useless pleading excuses; two long days were occupied in shooting and skinning. The two species obtained on this occasion were the Red-backed Hummingbird (*Selasphorus rufus*), often described as the Nootka Hummingbird, because it was first discovered in Nootka Sound, on the west side of Vancouver Island; the other, one of the smallest known species, called Calliope. This exquisite little bird is mainly conspicuous for its frill of minute pinnated feathers encircling the throat, of most delicate magenta

tint, which can be raised or depressed at will. Prior to my finding it in this remote region, it was described as being entirely confined to Mexico.

About a week had passed away; the bridge was completed, during which time the female birds had arrived; and, save a stray one now and then, not a single individual of that numerous host that had gathered round the *Ribes* was to be seen. They cared nothing for the gun, and would even dash at a dead companion as it lay on the grass; so I did not drive them away, but left them to scatter of their own free will.

My next camping-place was on the western slope of the Rocky Mountains, near a lake, by the margin of which grew some cottonwood trees (*Salix scouleriana*), together with the alder (*Alnus oregona*), and the sweet or black birch (*Betula leuta*). My attention was called to the latter tree by observing numbers of wasps, bees, and hornets swarming round its trunk. The secret was soon disclosed: a sweet gummy sap was exuding plentifully from splits in the bark, on which hosts of insects, large and small, were regaling themselves. As the sap ran down over the bark, it became very sticky, and numbers of small winged insects, pitching on it, were trapped in a natural 'catch-'em-alive-O.'

Busily occupied in picking off these captives were several very sombre-looking hummingbirds. They poised themselves just as the others did over the flowers, and deftly nipped, as with delicate forceps, the helpless insects. I soon bagged one, and found I had a third species, the Black-throated Hummingbird (*Trochilus Alexandri*). Were any proof needed to establish the fact of hummingbirds being insect-feeders, this should be sufficient. I saw the bird, not only on this occasion but dozens of times afterwards, pick the insect from off the tree, often killing it in the act; and found the stomach, on being opened, filled with various species of winged insects.

The habits of the three species differ widely. The Red-backed Hummingbird loves to flit over the open prairies, stopping at every tempting flower, to catch some idler lurking in its nectar-cells. Building its nest generally in a low shrub, and close to the rippling stream, it finds pleasant music in its ceaseless splash. Minute Calliope, on the other hand, prefers rocky hillsides at great altitudes, where only pine-trees, rock-plants, and an alpine flora 'struggle for existence.' I have frequently killed this bird above the line of perpetual snow. Its favourite resting-place is on the extreme point of a dead pine-tree, where, if

undisturbed, it will sit for hours. The site chosen for the nest is usually the branch of a young pine; artfully concealed amidst the fronds at the very end, it is rocked like a cradle by every passing breeze.

The Black-throated Hummingbird lingers around lakes, pools, and swamps where its favourite trapping-tree grows. I have occasionally, though very rarely, seen it hovering over flowers; this, I apprehend, is only when the storehouse is empty, and the sap too dry to capture the insects. They generally build in the birch or alder, selecting the fork of a branch high up.

All hummingbirds, as far as I know, lay only two eggs; the young are so tightly packed into the nest, and fit so exactly, that if once taken out it is impossible to replace them. Several springs succeeding my first discovery that these hummingbirds were regular migrants to boreal regions, I watched their arrival. We were quartered for the winter close to the western slopes of the Rocky Mountains. The winters here vary in length, as well as in depth of snow and intensity of cold, 33° below zero being no unfrequent register. But it did not matter whether we had a late or early spring, the humming-

birds did not come until the *Ribes* opened; and in no single instance did two whole days elapse after the blossoms expanded, but Selasphorus and Calliope arrived to bid them welcome. The males usually preceded the females by four or five days.

The Black-throated Hummingbird arrives about a week or ten days after the other two. Marvellous is the instinct that guides and the power that sustains these birds (not larger than a good sized humblebee) over such an immense tract of country; and even more wonderful still is their arrival, timed so accurately, that the only flower adapted to its wants thus early in the year opens its hoards, ready to supply the wanderer's necessities after so tedious a migration!

It seems to me vastly like design, and Foreseeing Wisdom, that a shrub indigenous and widely distributed should be so fashioned as to produce its blossoms long before its leaves; and that this very plant alone blooms ere the snow has melted off the land, and that too at the exact period when hummingbirds arrive. It cannot be chance, but the work of the Almighty Architect—who shaped them both, whose handiwork we discover at every step, and of whose sublime conceptions we everywhere observe the

manifestations in the admirably-balanced system of creation !

The specific characters of these three species, whose northern range I believe was first defined by myself, are briefly as follows :—

Selasphorus rufus (the Nootka or Red-backed Hummingbird).—Male: tail strong and wedge-shaped ; upper parts, lower tail-coverts, and back, cinnamon ; throat coppery red, with a well-developed ruff of the same, bordered with a white collar ; tail-feathers cinnamon, striped with purplish-brown. Female: plain, cinnamon on the back, replaced with green ; traces only of metallic feathers on the throat. Length of male, 3.50 ; wing, 1.56 ; tail, 1.31 inches. Habitat: West coast of North America to lat. 53° N., extending its range southward through California, to the Rio Grande.

Stellata Calliope.—Male: back bright-green ; wings brownish ; neck with a ruff of pinnated magenta-coloured feathers, the lower ones much elongated ; abdomen whitish ; length, about 2.75 inches. Female, much plainer than the male, with only a trace of the magenta-coloured ruff.

Trochilus Alexandri (Black-throated Hummingbird).—Male: tails lightly forked, the chin and upper part of the throat velvety black

without metallic reflections, which are confined to the posterior border of the black, and are violet, changing to steel-blue. Length, 3.30 inches. Female, without the metallic markings; tail-feathers tipped with white. Both have the same northern and southern range as *Selasphorus rufus*.

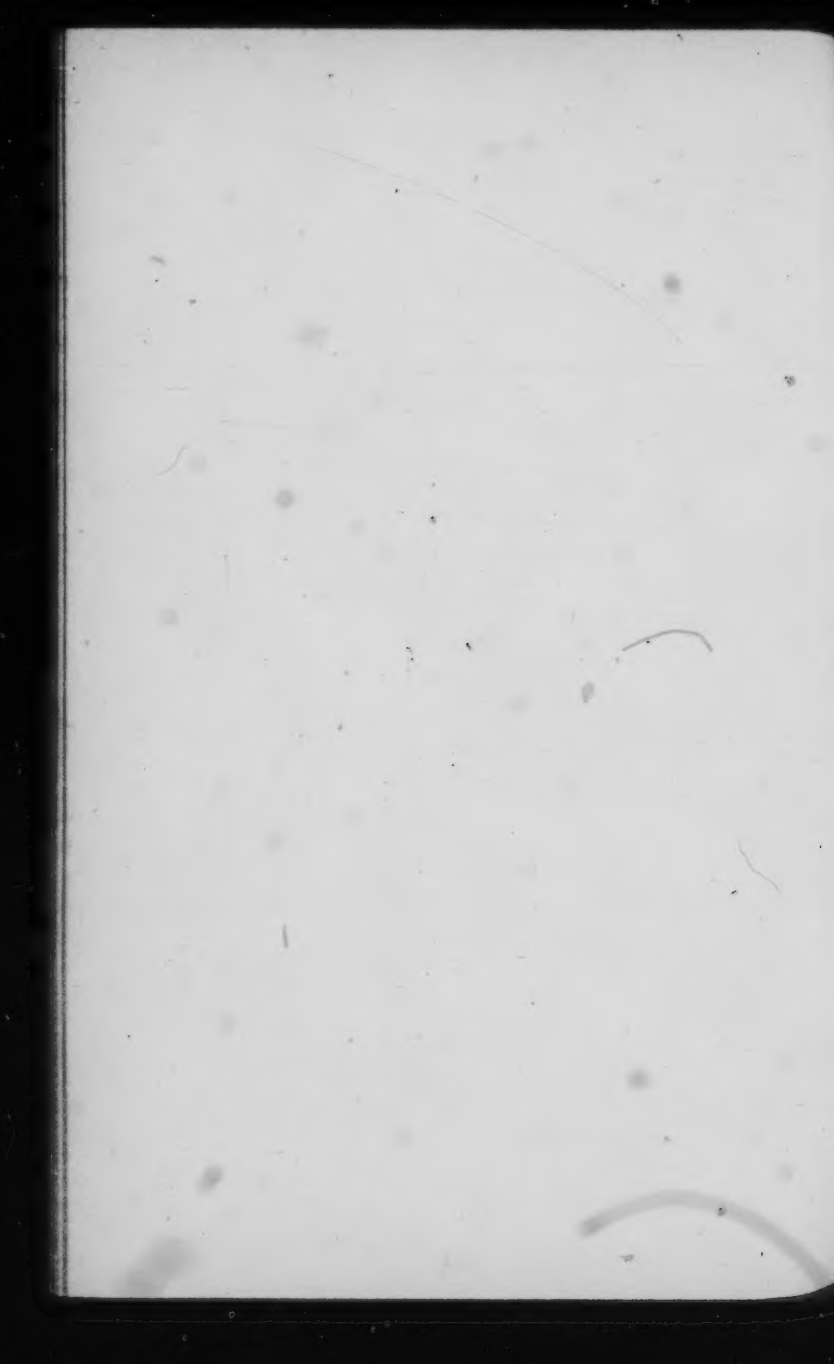
Urotrichus Gibbsii, Baird (Western slope of Cascade Mountains); *Urotrichus Talpoides*, Temminck.—This singular little animal, that appears to be an intermediate link between the shrew and the mole, at present is only known as an inhabitant of two parts of the world, widely removed from each other—the one spot being the western slope of the Cascade Mountains, in North-west America, the other Japan. There are, as far as I know, but two specimens extant from the Cascade Mountains—one in the Smithsonian Museum at Washington, the other a very fine specimen that I have recently brought home, and now in the British Museum.* I have carefully compared the Japanese gentleman with his brother from the Western wilds, and can find no difference whatever, either generically or specifically. In size, colour, shape, and anatomical structure they are precisely alike.

The habits of the little fellow from Japan I

* Vide Illustration.



THE UROTRICHUS
(Urotrichus Gibbif).



know nothing about, but with my friend from the North-west I am much more familiar; and I shall endeavour to introduce him to you as life-like as I can, from what I have jotted down in my notebook. First, then, the *Urotrichus* is an insectivorous mammal, its size that of a large shrew, about two-and-a-quarter inches in length, exclusive of tail, which is about an inch and a half. This tail is covered thickly with long hairs, which at the tip end in a tuft like a fine camel's-hair pencil, and from this hairy tail it gets the name, *Urotrichus*.

Its colour is bluish-black when alive, but in the dried specimens changes to sooty-brown. The hair is lustrous, and, where it reflects the light, has a hoary appearance, and, as with the mole, it can be smoothed in either direction; this is a wise and admirable arrangement, as it enables the animal to back through its underground roads, as well as to go through them head-first. Its nose or snout is very curious, and much like that of a pig—only that it is lengthened out into a cylindrical tube, covered with short thick hairs, and terminated in a naked fleshy kind of bulb or gland; and this gland is pierced by two minute holes, which are the nostrils. Each nostril has a little fold of membrane hanging down over it like

a shutter, effectually preventing sand and minute particles of dust from getting into the nose whilst digging.

Now this curious nasal appendage is to this miner not only an organ of smell, but also serves the purpose of hands and eyes. His forefeet, as I shall by-and-by show you, are wholly digging implements, and, from their peculiar horny character, not in any way adapted to convey the sense of touch. Eyes he has none, and but a very rudimentary form of ear; his highly sensitive moveable nose serves him admirably in the dark tunnels, in which his time is passed, to feel his way and scent out the lower forms of insect life, on which he principally feeds. Had he eyes he could not see, for the sunlight never peeps in to cheer his subterranean home, and sound reaches not down to him. The busy hum of insect life, and the song of feathered choristers, he hears not, so that highly-developed hearing appendages would have been useless and superfluous.

But his nose in every way compensates for all these apparent deficiencies, and shows us how to be admired is Creative Goodness in shaping and adapting the meanest and humblest of His creatures to its habits and modes of life. His forefeet are, like the mole's, converted into diggers;

the strong scoop-shaped nail, like a small garden-trowel at the end of each toe, enables him to dig with wonderful ease and celerity. The hind-feet are shaped into a kind of scraper by the toe being curiously bent, and the length of the hind-foot is about two-thirds more than the fore or digging hand. When I come to his habits, as differing from the mole, I shall be able to point out the use of this strange scraper-like form of hind-foot.

So far I have endeavoured to give you an outline of his general personal appearance, differing from the shrew in the peculiar arrangement of his feet, and from the mole in having a long hairy tail. His nearest relative (if at all related) is the *Condylura*, or Star-nosed Mole, whose nose has a fringe of star-shaped processes round its outer edge, about twenty-two in number. The first and only place in which I ever met this strange little fellow was on the Chilukweyuk prairies. These large grassy openings, or prairies, are situated near the Fraser river, on the western side of the Cascade Mountains. Small streams wind and twist through these prairies like huge water-snakes, widening out here and there into large glassy pools.

The scenery is romantic and beautiful beyond description. Towering up into the very clouds,

as a background, are the mighty hills of the Cascade range, their misty summits capped with perpetual snow—their craggy sides rent into chasms and ravines, whose depths and solitudes no man's foot has ever trodden, and clad up to the very snow-line with mighty pine and cedar-trees. The Chilukweyuk river already referred to washes one side of the prairie. Silvery-green and ever-trembling cotton-wood trees, ruddy black-birch, and hawthorn, like a girdle, encircle the prairie, and form a border, of Nature's own weaving, to the brilliant carpet of emerald grass, patterned with wild flowers of every hue and tint,—all shading pleasantly away, and losing their brilliancy in the dark green pine-trees.

In the sandy banks on the edge of the Chilukweyuk river, and the various little streams winding through the prairie-grass, lives the Urotrichus. His mansion is a large hole, lined with bits of grass, and this hole is his sleeping-room and drawing-room. A genuine bachelor, he never dines at home. He has lots of roads tunnelled away from his central mansion, radiating from it like the spokes of a wheel. His tunnels are not at all like those of the mole; he never throws up mounds or heaps of earth, in order to get rid of the surplus material he digs out, as the mole does,

but makes open cuttings at short intervals, about four or five inches long; and now we shall see the use of those curiously-formed scraper-like hind-feet.

As he digs out the tunnel with his trowel-hands, he throws back the earth towards his hind-feet; these, from their peculiar shape, enable him to back this dirt out of the hole, using them like two scrapers—only that he pushes the dirt away, instead of pulling it towards himself. Having backed the dirt clear of the mouth of the hole, he throws it out over the edge of the open cutting; after having dug in some distance—and finding, I daresay, the labour of backing-out rather irksome—he digs up through the ground to the surface, makes another open cutting, and then begins a new hole or tunnel, and disappears into the earth again. When he has gone as far from his dormitory as he deems wise, he again digs through, and clears away the rubbish. This road is now complete, so he goes back again to his central mansion, to begin others at his leisure.

It is very difficult to watch the movements and discover the feeding-time, or what he feeds on, of an animal which lives almost wholly underground in the daytime; but I am pretty sure these tunnels are made for and used as roadways,

or underground trails for the purpose of hunting. He is a night-feeder, and exposed to terrible perils from the various small carnivora that prowl about like bandits in the dark—stoats, weasels, martens, and skunks. So, to avoid and escape these enemies, he comes quietly along the subterranean roadways, and cautiously emerging at the open cutting, feels about with his wonderful nose; and I doubt not, guided by an acute sense of smell, pounces upon larvæ, slugs, beetles, or any nocturnal creeping-thing he can catch; and so traversing his different hunting-trails during the night, manages in that way to fare sumptuously, and safe from danger. Turning in, to sleep away his breakfast, dinner, and supper, at the first peep of the grey morning, he dozes on, until hunger again prompts him to make another excursion on the 'hunting-path.'

It is scarcely possible to imagine a more skillfully-contrived hunting-system, to avoid danger and facilitate escape, than are these tunnel-trails with open cuttings; for the sly little hunter has, on the slightest alarm, two means of flight at his disposal—one before and another behind him; and the fur, as I have already mentioned, laying as evenly when smoothed from tail to head as it does when turned in the natural direction, enables

him to turn astern, and retreat tail-first into his hole as easily as he could go head-first.

When we contemplate this grotesque and strangely-formed little creature, and see how wisely and wonderfully it is fashioned and adapted to its destined place, supplying another missing link in the great chain of Nature, we cannot but feel God's power and omnipresence. Feeding in the dark and living in the dark, eyes would have been superfluous; sound, save from vibration in the earth, or when hunting at the open cuttings, would seldom reach this tiny *hermit*; hence the hearing organs have no external appendage for catching sounds, and are but in a rudimentary form. Hands fashioned into marvellous digging-tools, and hind-feet turned into scrapers, for getting rid of the rubble dug out with the hands, and nose possessing smell and touch in their most exquisite forms, these serve him for guides of unerring certainty and undeviating precision through his darksome wanderings.

CHAPTER XIII.

THE APLODONTIA LEPORINA. (Rich.)

(Sewellel or Show'tl of the Nesqually Indians.)

SYNONYMS.—*Aplodontia leporina*, Rich., F.B. A. i. 211, plate xviii.; Aud. Bach. N.A. Qua. iii., 1853, 99, pl. cxxiii.; *Hoplodon leporinus*, Wagler System, Amh., 1830; *Anisonyx rufa*, Rafinesque, Am. Month. Mag. ii. 1817; *Arctomys rufa*, Harlan, F. Am. 1825, 308; *Sewellel*, Lewis and Clark's Travels, ii. 1815, 176.

General Dimensions.—Nose to ear, 2 in. 7 lines; nose to eyes, 1 in. 5 lines; tail to end of vertebrae, 9 lines; tail to end of hair, 1 in. 2 lines; ear, height, 5 lines; nose to root of tail, 14 in. 6 lines.

I FIRST met with this rare and curious little rodent on the bank of the Chilukweyuk river. My canvas house is pitched in a snug spot, overshadowed by a clump of cottonwood trees, growing close to a stream, that like liquid crystal, ripples past in countless channels, finding its way betwixt massive boulders of trap and greenstone, rounded and polished until they look like giant marbles.

Towering up behind me are the Cascade Moun-



OU-KA-LA

(*Aplodontia leporina*).



tains, with snow-clad summits dim in the haze of distance, their craggy slopes split into chasms and ravines, so deep, dark, and lonesome, that no man's footfall has ever disturbed their solitudes, so densely wooded up to the very snow-line with pine, that a bare rock has hardly a chance to peep out, and break the sombre monotony of the dark-green foliage.

Before me, stretching away for about three miles, is an open grassy prairie, one side of which is bounded by the Chilukweyuk river, the other by the Fraser. At the junction of the two streams, at an angle of the prairie, stands an Indian village: the rude-plank sheds and rush-lodges; the white smoke, curling gracefully up through the still atmosphere from many lodge-fires; the dusky forms of the savages, as they loll or stroll in the fitful night, give life and character to a scene indescribably lovely.

The Indian summer is drawing to a close; the maple, the cottonwood, and the hawthorn, fringing the winding waterways, like silver cords intersecting the prairie, have assumed their autumn tints, and, clad in browns and yellows, stand out in brilliant contrast to the green of the pine-forest. The prairie looks bright and lovely; the grass, as yet untouched by the frost-fairy's

fingers, waves lazily; wild flowers, of varied tints, peep out from their hiding-places, enjoying to the last the lingering summer.

I had been for some time sitting on a log, admiring the sublime beauty of the scene, spread out before me like a gorgeous picture; the sun was fast receding behind the hilltops, the lengthening shadows were fading and growing dimly indistinct, the birds had settled down to sleep, and the busy hum of insect life was hushed. A deathlike quiet steals over everything in the wilderness as night comes on—a stillness that is painful from its intensity. The sound of your own breathing, the crack of a branch, a stone suddenly rattling down the hillside, the howl of the coyote, or the whoop of the night-owl, seem all intensified to an unnatural loudness. I know of nothing more appalling to the lonely wanderer camping by himself than this 'jungle silence,' that reigns through the weary hours of night.

This silence was suddenly broken, as was my reverie, by a sharp ringing whistle; it was so piercing and clear, that I could not believe it was produced by an animal. Hardly had it died away, when another whistler took it up, then a third, and so on, until at least a dozen had joined

in the chorus. I stole carefully in the direction from which the sound came, but as I neared the spot the whistle ceased, and it was now far too dark to descry any object on the ground. So, in doubt, and sorely puzzled to account for such an unusual sound, and with a firm determination to unravel the mystery in the morning, I returned to my camp. Could it be Indians? No, impossible; there were far too many whistlers, and the tone of each whistle was precisely alike. I was equally sure it was not the cry of the rock-whistler (*Actomys*); that sound I knew too well. What could it be?

As the grey light of morning came peering into my tent, I started off to investigate the secret of the mysterious whistler; but all I could discover, after a long and diligent search, was, that there were numerous runs and burrows excavated in the sandy banks of the river, but by what sort of animal I could not for the life of me guess. Setting a steel-trap at the entrance to one of the holes, I strolled down to the Indian village, thinking I should possibly be able to find out from the redskins what it was that made such shrill sounds. Partly by signs, and by using as much of their language as I knew, I endeavoured to make the old chief comprehend my queries.

After attentively watching my absurd attempts to produce a ringing whistle by placing my fingers in my mouth, and blowing through them until my face was like an apoplectic coachman's, a smile of intelligence lit up his swarthy visage: then I violently dug imaginary holes, and explained that the sounds came about twilight; he nodded his head, dived into the tent, and disappeared in the smoke, to shortly emerge again with a rug or robe, made from the skins of an animal that was quite new to me.

It was beautifully soft, glossy, and brown. The skins were about the size of a large rat's, and about twenty in number. Here, then, was the dawn of a discovery. He called the animal *Ou-ka-la*, and made me understand that it lived on roots and vegetable-matter, and burrowed holes in the ground.

As the daylight faded out, I again took my seat; and, just as before, when everything was silent, the woods echoed with the *Ou-ka-la*'s cry. I longed for morning, and hardly waited for light, but hastened off to my trap; and, joy of joys, I had one sure enough, caught by the neck. Poor *Ou-ka-la*! your friends had heard, and you had given, your 'last whistle.' He was dead and cold—trapped, perhaps, whilst I listened won-

deringly, keeping my lonely vigil. A very brief examination revealed the fact that I had caught a magnificent specimen of the *Aplodontia leporina*, of which I had only read.

Captains Lewis and Clark obtained some vague information about this animal, which is given in their journal of travel across the Rocky Mountains, in 1804. All they say of its habits is, 'that it climbs trees, and digs like a squirrel.' They obtained no specimen of the animal, but saw, probably, robes made of the skins. It was subsequently described by Rafinesque, and by him named *Anysonyx rufa*, and by Harlan *Arctomys rufa*. In 1829 Sir John Richardson obtained a specimen, and, after a careful anatomical examination, this eminent naturalist determined it to be a new genus, and renamed it, generically and specifically. The generic name (*Aplodontia*) is founded on its having rootless molars, or grinding teeth—*aploos*, simple; *odons*, a tooth. It belongs to the sub-family *Castorinae*, dental formula $\frac{2}{2} \frac{00}{00} \frac{55}{44} 22$.

Sp. ch.—Size, that of a musk-rat; tail very short, barely visible; colour, glossy blackish-brown. Male, length about 14 inches; female resembling the male, but smaller. The fur is dense and woolly, with long bristly hairs, thickly

interspersed; the short fur is bluish-gray at the base, the ends of the hairs being tipped with reddish-brown; the bristles are black, and when smooth give a lustrous appearance to the fur. The eyes are very small, and placed about midway between the nose and the ear. The whiskers, stiff and bristly, are much longer than the head, and dark grey. The ears are covered on both sides with fine soft hair, rounded and very short, and not unlike the human ear.

Skull.—The skull is much like that of the squirrel's, with the marked exception of having rootless molars, and the absence of post-orbital processes; the occipital crest is well-developed, the muzzle large, and nearly round. The bony orbits are largely developed; the auditory bullæ are small, but open at once into wide auditive tubes; the first molar is unusually small, oval, and situated against the antero-interpal angle of the second. All the molars are rootless: the lower grinders are much like the upper, but somewhat longer and narrower. The molars in both jaws are situated much farther back than is usual, the centre of the skull being about opposite to the meeting of the second and third. The lower jaw is very singularly shaped, the inner edges of the molars on opposite sides being

parallel; the descending ramus is bent, so as to be exactly horizontal behind, the postero-inferior edge being a straight line, nearly perpendicular to the vertical plane of the skull's axis. The conformation of the incisor-teeth is admirably adapted to the purposes they have to fulfil; no carpenter's gouging chisels are more effective tools than are these exquisitely-constructed teeth. It is essential that they should always have a sharp-cutting edge, in order to nip through the tough vegetable fibre on which the animal subsists; at the same time, strength and durability are indispensable. The Aplodontia has no whetstone or razor-grinder, to sharpen his tools when they grow blunt; but an Allwise Providence has so fashioned these wondrous chisels in all rodents, that the more they are used the sharper they keep; the contrivance is simple as it is beautiful. The substance of the tooth itself is composed of tough ivory, but plated on the outer surface with enamel as hard as steel. The ivory, being the softer material, of course wears away faster than the enamel; hence the latter, plating the front of the tooth, is always left with a sharp-cutting edge.

The position this genus should occupy, in a systematic arrangement of the rodents, has always

been a stumbling-block and a matter of doubt, in great measure attributable to the fact that but a single species of the genus is known, and very few specimens have hitherto been obtained. A fine male specimen has recently been set up in the British Museum collection, that I caught near my camp on the prairie.

In many particulars the Aplodontia very nearly resembles the *Spermophiles*, particularly the prairie-dog (*Cynomys Ludoviciana*), but differs, as in the true squirrels, in the rootless molars and absence of post-orbital processes. In this respect it is allied to the beaver. It is quite impossible to assign it a well-defined and settled position, until a greater number of specimens are procured, from which more minute and careful examination of the bony and internal anatomy can be made. At present, however, it would appear to connect the beavers with the squirrels, through the *Spermophiles*.

The name Lewis and Clark gave this animal, Sewellel, is evidently a corruption of an Indian word. The Chinook Indians, once a powerful tribe, live near the mouth of the Columbia; and from them, in all probability, Lewis and Clark obtained the name, and first heard of the animal. But the Chinook name for the Aplodontia is *Og-*

ool-lal, Shu-wal-lal being the name of the robe made from the skins; and this is unquestionably the word corrupted into Sewellel, and misused as the name of the animal. In Puget's Sound the Nesqually Indians call it *Show'tl*; the Yakama Indians, *Squal-lah*; and the Stumass Indians, *Swok-la*.

A single glance at the conformation of the feet would at once convince the most careless observer that climbing trees was not a habit of the Aplodontia. The feet and claws are digging implements, of the most finished and efficient kind: the long scoop-shaped nails, resembling garden trowels; wide strong foot, almost hand-like in its form; the strong muscular arms, supported by powerful clavicles, proclaim him a miner; his mission is to burrow, and most ably he fulfils his destiny. His haunt is usually by the side of a stream, where the banks are sandy, and the underbrush grows thickly; his favourite food being fine fibrous roots, and the rind of such as are too hard for his teeth. He spends his time in burrowing, not so much for shelter and concealment, as to supply himself with roots. He digs with great ease and rapidity, making a hole large enough for a man's arm to be inserted.

In making the tunnels, he seldom burrows very

far without coming to the surface, and beginning a new one. Like a skilful workman, he knows how to economise labour. Having to back the earth out of the mouth of the hole he is digging, the farther he gets in the harder grows the toil; and so he digs up through, and starts afresh. They seldom come out in the daytime, and I have but rarely heard them whistle until everything was still, and the twilight merged into night.

The female has from four to six young at a birth, and she has about two litters in a year. The nest for the young is much like that of the rabbit, made of grass and leaves, and placed at the end of a deep burrow. In the winter they only partially hibernate, frequently digging through the snow to eat the bark and lichen from the trees. Their gait when on the ground is very awkward; their broad short feet are not fitted for progression, and they shamble rather than run, and can be easily overtaken. Where a colony of them have resided for any time, the ground becomes literally riddled with holes, and the trees and shrubs die for want of roots. I imagine, from having found abandoned villages, that they wisely emigrate when their resources are exhausted. The Indians esteem their flesh a great luxury, and trap them in a kind of figure-of-

four trap, set at the mouth of the burrow. I daresay they are as good as a rabbit; still, they have too ratlike an appearance to possess any gastronomic attractions for me. *De gustibus non est disputandum.*

The Aplodontia has a terrible and untiring enemy in the badger (*Taxidea Americana*). He is always on the hunt for the poor little miner, digs him out from his hiding-place, and devours him with as much gusto as the Indian. Its geographical range is not very extended, being, as far as I know, confined to a small section of Northwestern America. I have seen it on the eastern and western slopes of the Cascades, but not on the Rocky Mountains, although it very probably exists there. It is also found at Puget's Sound, Fort Steilacum, and on the banks of the Sumass and Chilukweyuk rivers, west of the Cascades; on the Nachess Pass, at Astoria and the Dalles, on the Columbia, east of the Cascades.

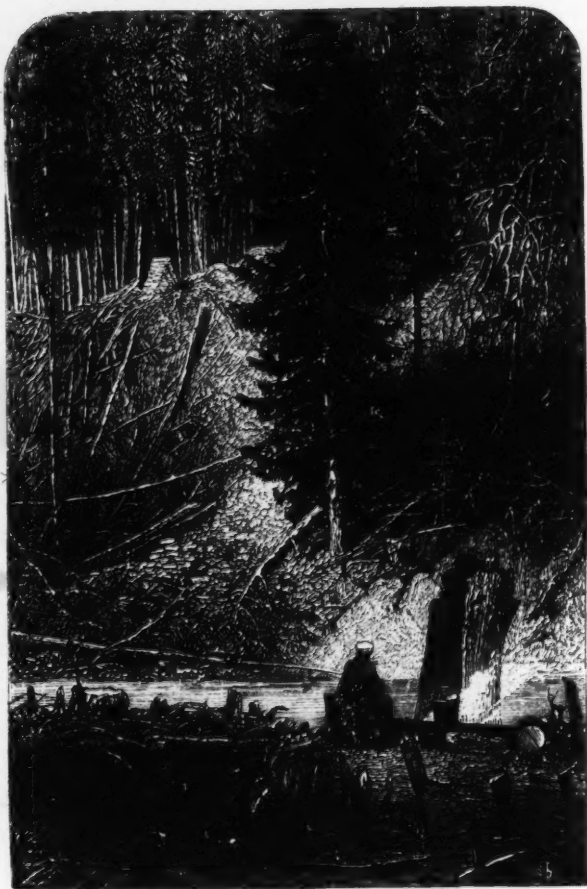
Feeding entirely on vegetable matter (I never discovered a trace of insect or larvæ remains in the stomach), passing its life principally in dark burrows, and limited, as far as we know at present, to a very narrow section of a barren country, it is hard to imagine what purpose it serves in the great chain of Nature, save it be that

of supplying food to the badger, and both food and clothing to the savage; and yet we know that it was fashioned for some specific purpose, if we could but read and rightly interpret the pages of Nature's wondrous book. If we ask ourselves, Why was this or that made? how seldom can we answer the question! Why did He, who made the world, the sun, and the stars, deck the butterfly's wing with tiny scales, that by a simple change in arrangement produce patterns beside which the most finished painting is a bungling daub? Why exist those microscopic wonders, (diatoms and infusoria,) formed with shells of purest flint, and of the quaintest devices? Why were these atomies, that tenant every roadside pool, which dance in the sunbeam, and float on the wings of the breeze? Why all the prodigal variety of strange forms crowding the sea, forms more wonderful than the poet's wildest dreams ever pictured? Who can tell?

END OF THE FIRST VOLUME.

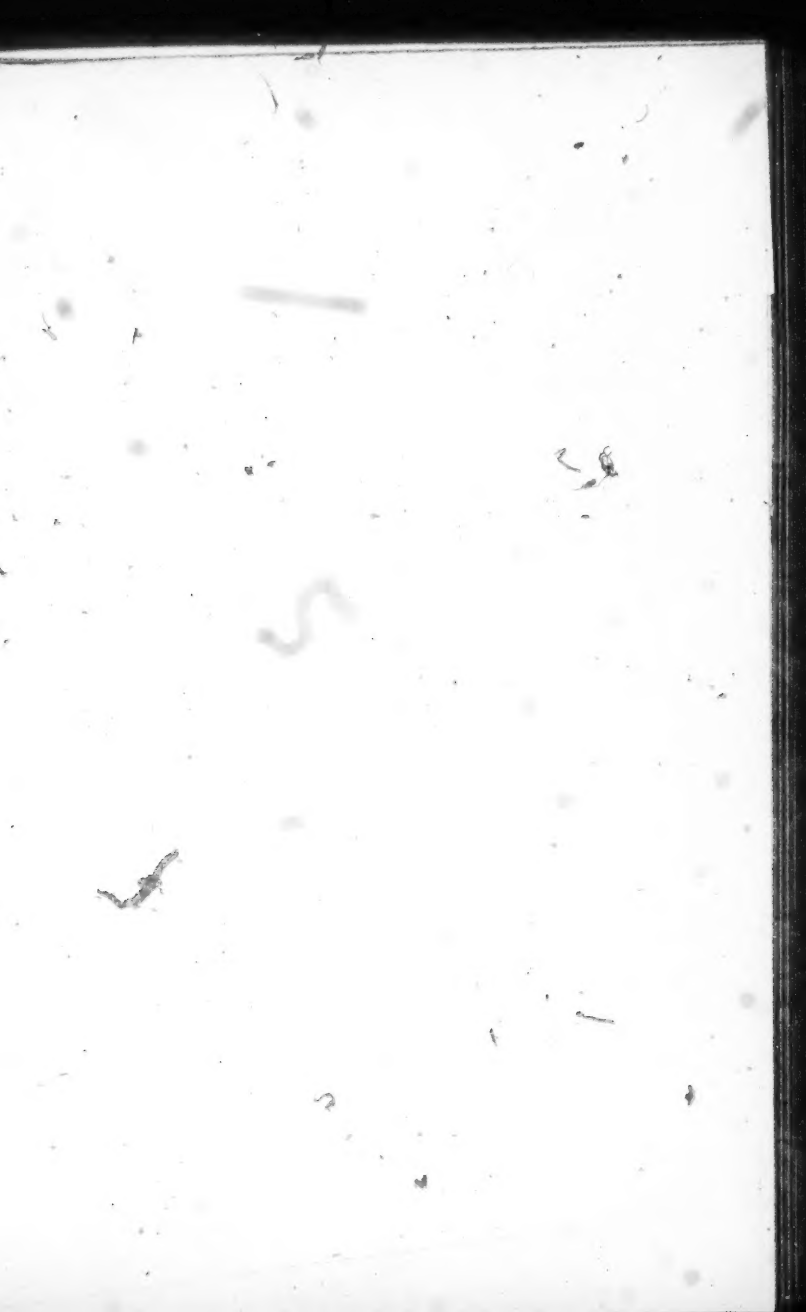
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A CAMP ON THE BOUNDARY LINE.

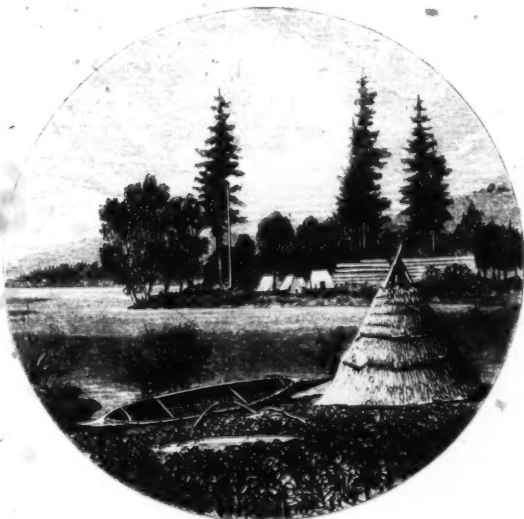




THE NATURALIST
IN
VANCOUVER ISLAND AND
BRITISH COLUMBIA.

BY
JOHN KEAST LORD, F.Z.S.

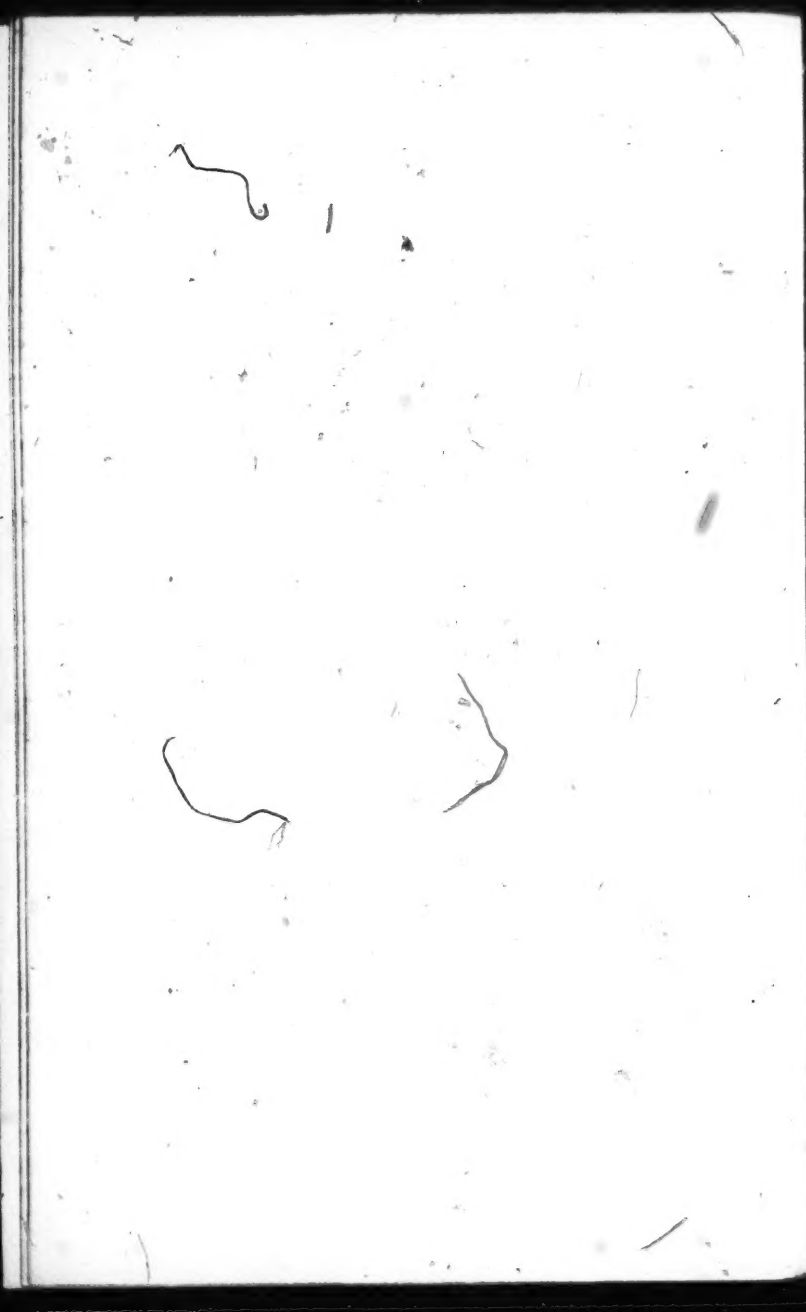
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SYNIAKWATEEN (THE CROSSING).

IN TWO VOLUMES—VOL. II.

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A Camp on the Boundary-line	<i>frontispiece</i>
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ERRATA IN VOL II.

Page	23,	line	2,	for dry read dyed
"	38,	"	18,	for ruts read mountains
"	105,	"	11,	for cliffs read cliffs
"	120,	"	27,	for unite read quite
"	141,	"	26,	for illustration in vol. i. read frontispiece vol. ii.
"	186,	"	19,	for jaws they read the jaws are
"	208,	"	10,	for lynch read synch
"	209,	"	7,	for lynch read synch
"	223,	"	27,	for rly read risky
"	245,	"	2,	for Cowlitz read Cowlitz
"	250,	"	15,	omit word page after illustration
"	251,	"	22,	* This illustration was unavoidably omitted, not being ready in time for publication
"	255,	"	15,	for Symukwateen read Syniakwateen
"	267,	"	22,	for SAYAS read HYAS. The letters N. S. to be omitted

VANCOUVER ISLAND

AND,

BRITISH COLUMBIA.

CHAPTER I.

CALIFORNIAN GROUND-SQUIRREL—BURROWING OWL AND GREEN-RACER SNAKE—SKUNK AND ITS ODOUR—RETURN TO VANCOUVER ISLAND—KEYHOLE LIMPET AND PARASITE (LEPIDONOTUS LORDI)—DENTALIA OR MONEY-SHELL.

THE CAMP of the Commission is pleasantly situated in a hollow, rather than a valley, between rounded hills, perfectly bare of timber, that form, as it were, a background to the little town at the Dalles. A small stream trickled near the tents, with only a few gnarled oaks growing on its banks.

Two animals are seen constantly, and appear in unusual abundance. One dwells amidst the rocks, that are piled in vast masses at the foot of the ravine, where we are camping, and is equally plentiful along the rocky banks of the Columbia river to the valley of the Des Chutes, beyond which, in the direction of Fort Colville, it is never

seen. This is easily accounted for. The Columbia ground-squirrel (*Spermophilus Douglassii*) lives principally on acorns; and the oak ceasing to flourish beyond the river, it becomes the boundary-line both to the oak and its dependant.

The Indians prize the *Wos-kee* both for its skin and carcase, devouring the latter, and sewing the former into robes. The *Wos-kee* gets as fat as a tame rabbit, and hybernates during winter. A shy active little animal, it is most difficult to obtain, dashing into the burrows betwixt and under the rocks on the slightest noise. They occasionally travel out on the grass-flats some distance from their retreats, and if frightened, elevate the long foxlike tail over the back, and in a series of most astounding bounds, make all speed for home. In the absence of their favourite acorns, they devour grass, roots, and the bark from any shrubs comeatable. The fur is dark-brown, with very long black hairs scattered through it. The ears are long, and a whitish circle round the eye gives the animal a comic expression, a kind of pantaloon face. Chin and throat a foxy-brown; sides yellowish, divided from the darker shade of the back by a wide stripe; tail bushy, and quite as long as the body, which is about eleven inches.

Living near the water, but occasionally wandering amongst the grass, are quantities of brilliant green snakes, the green-racer (*Bascanion vetustus*, Baird & Grd.). Not only does it bask on the grassy banks, or if frightened glide through the herbage, with arrowlike rapidity, but climbs trees with the ease and rapidity of a squirrel. In pursuit of tree-frogs, its favourite food, the snakes so nearly resemble green succulent branches, that I have often put my hand on them when birds'—nesting or seeking for insects. It always startled me, though I constantly took them in my hand, as I should a plant or a caterpillar, for examination. This snake's general residence is in the hole of a ground-squirrel, which is also chosen as a nesting-place by the western burrowing owl (*Athene cunicularia*).

I dug out several squirrel-holes whilst at this camp; in one I found two eggs of the burrowing owl, the female owl, a racer-snake, and an old lady-squirrel. The burrowing owl is strictly of diurnal habits, and feeds principally on crickets, grasshoppers, large beetles, and larvæ. I do not think it ever captures small animals or birds; a peaceful harmless bird, with little to boast of in appearance, voice, or wisdom. Why called *Athene* it would be hard to find out. Not by any means

plentiful, pairs of them are seen occasionally along the entire course of the boundary-line; but they are more plentiful southwards, through Oregon and California.

If on strolling up the stream, in the evening or early morning, your eyes should fail, the nose at once discovers that a skunk (*Mephitis mephitis*) has been taking a constitutional, and distributing a stench that, once inhaled, is not likely to be forgotten. Mix the very worst mud from the Thames on a summer-day, at low-water, with Rimmel's shop, a gasworks, fellmonger's yard, and knacker's boiling-furnace; and I will venture to assert that the odour produced, even if concentrated by the subtle power of chemistry, would be a mild and pleasant perfume, when matched against that of the skunk.

It is lucky for the trade of the perfumers, that their skill in essences, has not as yet attained to the power of concocting a perfume, equal in persistency to that secreted in the oil-glands of this most disagreeable animal; if such were the case, the sale of one small phial would supply an individual for a lifetime. A handkerchief odourised with scent so permanent, would defy the combined powers of soap, soda, and washerwomen to remove the mephitic bouquet, as long as the fabric retained its entirety.

Often in trapping, a poaching skunk has tried his thieving propensities on the dainty and tempting bait tied to a steel trap, cunningly laid in the run of a sable, and paid the penalty of his dishonesty by spending a night fast by the leg. The nose was quite enough to reveal what the captive was; the trap, the grass, the shrubs, the flowers, were all alike redolent of skunk. The smell met you, borne on the wings of the breeze, long ere the eye was capable of discerning the prisoner. Then to kill and extricate him from the trap was sure to entail a share of the stench, on gloves and clothes. Again and again I have buried gloves, trap, and trousers deep in the earth, and let them remain for weeks—a remedy of no avail:

Bury and wash, or rub as you will,
The scent of the skunk will cling to them still.

My constant companion was the Russian setter, that had as great a weakness for killing skunks, as he had for fishing out dead salmon. For days, nay weeks, after one of these encounters, I could hardly bear him near me; the sickening fœtor seemed to gain in strength as it exhaled from the dog, volatilised by the heat of his body.

We had a store near the Fraser River, a kind of depôt for provisions, from which the men were supplied who were employed in making the

boundary-line. In this store our storeman slept for some time, and, as bedsteads were superfluous luxuries, he camped on the floor. By some evil chance, a small colony of skunks obtained an entrance into the dormitory, and deemed a constitutional trot over the bed an enjoyable luxury. The skunk, jealous of interruption, if the sleeper (the victim of skunk incubus), hastily turned, then, as from a powerful syringe (as I have seen young ladies squirt scent from small metal bottles purchased at the Crystal Palace), the offended little night-walker fired its bottled nuisance over both the man and his bed. 'Once bit, twice shy,' says the adage. A light was carefully concealed behind a package; a double-barrelled gun, loaded with No. 5, capped and cocked, was placed within easy reach, and careful watch and ward kept. In happy ignorance, in marched the skunks for their nocturnal lounge, and, in the dead silence of the night, bang, bang! goes the gun, awaking everyone in the camp adjoining. I heard a Yankee packer, who slept near my tent, rouse up and exclaim, in nasal anger, 'Waal, thar's that varmint a fire-huntin' again. I'll be dog gone if I wouldn't sooner ~~lost~~ ^{lost} in a tree than camp down war them skunks is a makin' tracks all the night; I can smell em har!'

Intensely offensive though he be, nevertheless he is a handsome beast. The predominant colour is jet-black. A narrow snow-white line marks the centre of the forehead. Just behind the ears, from the nape, is a triangular patch of white, somewhat tinged with yellow. Confluent with this patch, two narrow lines of white run parallel to each other, for a few inches; then diverge rapidly, and extend along the back to near the tail, which is long and bushy, like that of the fox; but black, with a white tuft at the extreme tip. The length of the mature animal, from the nose to the root of the tail, is twenty-one inches.

The oil-glands are situated at the base of the tail. The animal possesses the power of ejecting the secretion with great force, and will hit an enemy at the distance of ten yards. The Indians and Voyageurs, after dissecting out the glands, devour the body with great gusto. The dissection and skinning are always done under water, in a running stream; by adopting this plan, the effluvia is washed away. I have tasted roasted skunk, but cannot say much in its praise. Its flavour is decidedly skunky, although the flesh is delicately white and tender.

The habits of the animal are strictly noc-

turnal, and a more predatory, thievish, treacherous, bloodthirsty poacher you could not 'skeer up.' His residence (which is always by the side of some still pool on the open prairie) consists of a large hole, dug in horizontally—a task rendered easy of performance when his powerful digging claws are brought into operation. Beaten roads extend from this hole to the water's edge; and the entrance to this den is usually strewed with ducks' feathers, the tips of the wings, the heads, beaks, and feet, together with bones deftly picked.

Ducks are his favourite birds; but, you ask, how can he possibly catch them? In this way. His instinct guides him to reside near the pools on which water-birds come to sleep and pass the night. When everything is still and hushed, and the unsuspecting birds are floating in fancied security, with their heads tucked under their wings, then out steals the crafty skunk, and creeping noiselessly down his roadways, swims, without the slightest splash, towards the drowsy birds, dives under the one that suits his taste, seizes it by the breast, and, spite of all its flapping, quacking, and struggling, drags the victim ashore, kills, and eats it. He seldom gets more than one in the night; for the other birds take timely warning, and leave for some safer retreat.

I have often wondered for what purpose this offensive secretion was given to the skunk. Any book on Natural History will tell you that it is a protection against all enemies. This I do not believe. Why given to the skunk and not to the pine-martin, ermine, or fisher, that live in the same localities, feed in the same robber-fashion; and have exactly the same foes? It is for other than defensive purposes.

The skunks are principally confined to America, extending through both halves of the continent, though a few are found in Mexico and Texas. They appear to form a connecting link betwixt the badgers and weazels proper.

Now let us return to Vancouver Island, and take up the story where I left it, to go mule hunting.

From amongst the singular group of annelides, found along the coast of Vancouver Island, many of which are new species, and will be found described in the Appendix, I select the most curious:—

Lepidonotus Lordi (Nov. Spc., Baird.).—This species is about three inches long, and rather more than one-third of an inch in diameter at the broadest part of the body. It tapers gradually from the head to the tail, which is only two-sixteenths of

an inch broad. The colour is of a light brown, a broad line of a much darker brown running along the whole length of the centre of the back.

On the under-surface a groove runs down the centre of the body throughout its whole length. The elytra are thirty-five pairs in number, thin, membranous, and of a light-brown colour. The two first overlap each other slightly in the middle, but for the rest of its length, the centre of the back is uncovered. The antennæ are five in number—the central one short, of much the same length as the internal ones; the two external the longest, white, with a bright black ring round the upper part, but leaving the point white, which is acute at the apex. The feet are tolerably stout, and the two divisions are both furnished with sharp, but curved, pointed bristles. The superior cirri are white and of a moderate length, the inferior ones very short.

A good many specimens of this species were taken, and they were all found nestling under the shell, and occasionally coiling themselves under the foot, of the animal of *Fissurella cratitia*.

The Keyhole Limpet, I may briefly state for the benefit of the unlearned in shellfish, is a gasteropodous mollusc, belonging to the family

Fissurellidæ; its generic name, *Fissurella*, being derived from the diminutive of *fissura*, a slit. In shape and colour the shell closely resembles the ordinary limpet (*Patella vulgata*), so common on our British coasts; possessing a like power of adhering to the rocks, with a tenacity requiring knife and hammer to overcome; its shape is conical, the base being occupied by a powerful muscle, which is not confined entirely within the shell. It performs the office of legs by its expansion and contraction, a means by which the creature moves from place to place on the rocks; a system of progression you may see for yourselves, if you watch a garden-snail taking a constitutional over a cabbage. This muscle also enables it to fix itself at pleasure, aided by an atmospheric pressure of 15 lbs. to the square inch. They browse on seaweed, and are usually between tide-marks.

At the apex of the shell is a hole, somewhat oval: hence the name of keyhole. This orifice is for the escape of the outgoing branchial current. There are about 120 species, inhabiting all parts of the world—India, China, Australia, and the Pacific at Vancouver Island. When shell-collecting near Esquimalt Harbour, I frequently picked up empty fissurellas on the beach;

but diligent research at dead low-water, in the rock-pools, failed to discover the living fish; neither did the dredge ever bring one up, from deep or shallow water. The empty house, in this instance, was less desirable than a bad tenant, as the mansion without its liege lord was a useless ruin.

Macauley's Point, a long ridge of rocks running far out to sea, but bare at low-water, was a favourite hunting-ground of mine, the snug little rock-basins generally affording some novelty, left prisoner by the receding water. An unusually low tide disclosed a ridge of rocks I had never before seen, an opportunity for exploration not to be neglected. Clinging to the slippery wrack, and scrambling down a vertical ledge, I discovered a regular cave, its sides and floor literally covered with the strangest collection of marine wonders I had ever gazed on:—

It was a garden still beyond all price;
E'en yet it was a place of paradise.

• • • • •

Here, too, were living flowers,
Which, like a bud compacted,
Their purple cups contracted,
Now, in open blossom spread,
Stretched, like green anthers, many a seeking head.
Others, like the broad banana growing,
Raised their long wrinkled leaves of purple hue,
Like streamers wide outflowing.—*Kehama.*

Actinia spread their treacherous petal-like arms, gorgeous in every variety of exquisite colouring; huge holothuria, like brilliantly-painted cucumbers, clung to the dripping rock; starfish of all sizes and tints—chitons in black spiny mail—shells of purpura and trochus, and hosts of kindred. Annelides too were peeping from out their cases of stone and horn, their exquisite feathery tufts, fishing-lines, and traps wondrously beautiful, but, like the embrace of a siren, fatal in its clasp; all these creatures, hungry and anxious, awaited the coming tide. Biding his time like the rest in this stronghold was the Keyhole Limpet.

I had found him at last, and at home, so pounced upon him as a lawful and legitimate prize. Knife and hammer soon severed his close attachment to the rocks; and turning him up, to take a peep at his powerful ring of muscle and strangely-formed breathing apparatus, I spied a worm evidently very uneasy, about three inches long, brown, and in shape like an ancient dagger-blade. He appeared to me to be wriggling out from betwixt the folds of the foot or the mantle, and apparently most anxious to escape.

My first impression was, that he was a captive that by some mischance had got imprisoned

under the shell of the fissurella; and, thanking his lucky stars for such a fortunate deliverance, wished to make the best of his liberty, and rejoin his friends. But in displacing other shells, I found in nearly every one a similar tenant: the secret was discovered—the worm was a parasite, that lived in peace and good-fellowship with the Keyhole, recalling to my remembrance Oppian's lines on the pinna and the parasitic crab—

One room contains them, and the partners dwell
Beneath the convex of one sloping shell,
Deep in the watery wastes the comrades rove,
And mutual interest binds their mutual love.

That the parasite worm does no harm is clearly proved by the healthy state of the mollusc in whose shell it takes up its abode. How far mutual interest may conduce to mutual friendship, I am unable to say.

On more carefully examining the position of the worm, I found it was invariably coiled away in a semicircle under the foot, like a ribbon on its edge, never flat. This seems to me a wise provision; for the pressure of the muscles when the limpet grips the rock would crush a soft-bodied worm to death, if flat; but by being edge on, which is the position chosen, all risk of harm is avoided, as it fits in a cleft between two layers of soft material.

Tying several of them tightly round to prevent the worm escaping, I brought them home *in situ*. At least four out of every six contained a parasite, and, what is rather strange, the worms were nearly all of one size. A query or two naturally suggest themselves. How did this friend or intruder, whichever it may be, first get installed as a lodger? Did he get in as a baby, and thus become an adopted child; or did he slip in as a full-grown annelide, defying the Keyhole Limpet to turn him out? How does he procure food; and on what does he subsist? I confess utter inability to give a satisfactory reply: my impression, however, is, that the parasite grows from a minute germ (if that is a right term) in the place and position in which I found it.

I put them in sea-water, after taking them out of their sanctuary, but in no single instance did one ever go back again. I tried to replace them, but could never accomplish it, or induce the worm to remain. Not that this proves anything, inasmuch as experience teaches that interference with the regular habits of any of the lower forms of life is at once resented; and the power, or will it may be, to adapt itself to altered circumstances is but slowly acquired. I cannot conceive the possibility of a large worm, the feet armed with

curved bristles, like bundles of minute fishhooks, being quietly permitted to creep under the shell, and force its way by crawling round and round the foot, by a system of hook-and-drag. In no other way, however, could it edge in, without worrying and enraging the fissurella beyond all power of endurance—ordinary pressure being only needed to squeeze the intruder flat as a pancake. By gently tickling it with a bit of seaweed under the shell, one would say that patience was a virtue but little cultivated by the fissurella; the slightest touch, and down goes the shell with a force that cuts the weed in two like scissors. What chance would a soft-bodied worm stand? Not the slightest. The parasite, like Topsy, was 'raised' where it lives.

What part a worm, doomed, as far as we know, to pass its whole life captive in the shell of a mollusc, plays on Nature's wide stage, is a problem beyond human ken. We know nothing was created in vain—that even the tiny diatom has its use; and this insignificant annelide serves a purpose and fulfils a destiny, in the endless maze of life, as important as the lordly lion, or even man himself.

It may not be generally known that the Dentalium, or Money-shell, is used as an article of currency by the native tribes of North-west America.

A genus of univalve shells, principally worthy of remark for brilliancy of colouring, and susceptibility of taking a high polish, and usually designated *cowries*, has long been used as a medium of currency. The animal living in the shell is a gasteropodous mollusc, and the money-shell belongs to a species well known in commerce as the *Cyprea moneta*, or money cowrie. This shell is the money, the current coin in use by the natives of Bengal, Siam, and various parts of Africa. The grand supply comes from the African coast, where the shells are collected by the negresses and exported to various parts of the world. Just as the cowrie is used in other parts of the world as money, so the *dentalium*, in North-west America, is applied to a similar purpose.

The form of the shell, as its name at once suggests, is tooth-shaped; but the tooth, the resemblance to which has given rise to the name, is the long holding or canine tooth of a carnivorous mammal: the holding-fang of the dog may be cited as a familiar illustration. The tenant of the shell belongs to the family *Dentaliadae*.

The shell has an orifice at both ends, and the animal inhabiting it is attached to its calcareous

house near the smaller opening. Eyes it has none, nor any long tentacles or fishing-arms. The blood is red, sexes united, and the breathing organs a symmetrical pair.

The food of these molluscs appears to be strictly of an animal character. Living, as I shall further on explain, in the sand, they wage war on and continually devour small bivalves, foraminifera, or any small marine zoophyte that an unlucky destiny may chance to wash within reach of these submarine cannibals.

The habit of the animal is to burrow in the sand, the small end of the shell being invariably downwards, to live in water from four to eight fathoms in depth, and always to choose a sheltered harbour or arm of the sea as its haunt. The large end of the shell placed close to the surface of the sand, allows the animal free scope to seize upon any unsuspecting wanderer that prowls near it.

The dentalium I now more particularly allude to has been recently described by Dr. Baird, in a paper read before the Zoological Society, with notes on its habits and monetary value, appended by myself:—

‘ Amongst the objects of Natural History and Ethnology brought from Vancouver Island and British Columbia by Mr. Lord, is a belt composed

of numerous specimens of a species of *Dentalium* strung together. The species bears an exceedingly close resemblance to that described by Linnæus as *Dentalium entalis* (*Entalis vulgaris* of Risso, and of Dr. Gray's "Guide to Mollusca"), and appears to me, notwithstanding the difference of habitat, to be undistinguishable from that European species. It has, however, been described by the late Mr. Nuttall as *Dentalium pretiosum*; and a figure has been given of it by Mr. Sowerby, in one of his late numbers of the "Thesaurus Conchyliorum."

'From a careful comparison of the typical specimens of *D. pretiosum*, in Mr. Cuming's collection, there can be no doubt of the identity of that species with the specimens brought by Mr. Lord from Vancouver Island; those in Mr. Cuming's collection are said to be from California.

'In examining the old river gravels on the banks of the Columbia River, alluded to in vol. ii. along with numerous other articles, such as human bones, flint instruments, &c., Mr. Lord found a number of specimens of a species of *Dentalium* considerably eroded and worn, which I have compared with some in Mr. Cuming's collection, and find identical with the *Dentalium striolatum* of Stimpson, from Newfoundland. I strongly

suspect that both these species, *D. striolatum* and *D. pretiosum*, are only very slight varieties of the old Linnæan species, *Dentalium entalis* (*Entalis vulgaris*).

'The habitats of the three species are very different; but notwithstanding this, in the absence of distinct specific characters, I should hesitate very much making distinct species of them. However that may be, the history of the specimens brought by Mr. Lord is very interesting; and these few observations must be considered only as introductory to the very instructive notes drawn up by that gentleman, a perusal of which will prove the best apology for these brief preliminary remarks.'

The money-shells are procured upon the north end of Vancouver Island; also in the bays and inlets along the mainland coast north of latitude of 49° to Sitka; and is common likewise round Queen Charlotte's Island. The genus has an enormous geographical range; and it is, perhaps, strange that the shells from North-west America, from California, and those obtained on our own coast, when placed side by side, scarcely present any material specific differences.

When a chief dies, of course, according to the redskin creed, he will require in the next world—

the happy hunting-grounds to which he has gone—all the luxuries and necessities his good fortune enabled him to enjoy in this: so it generally happens that two or three slaves (male and female), two or three horses, and two or three dogs are shot, and laid on or in the earth where rests the remains of the departed! But I have always observed that very old slaves, and very ancient canine and equine quadrupèds, are deemed by the sorrowing relatives quite good enough to send on such a hazardous journey—a wise economy, worthy of a better cause. These slaves are bought and sold after the fashion of dogs and horses, and shells of the dentalium are the sovereigns and shillings used to pay for them.

Indians are, without an exception, most inveterate gamblers. I do not know a single tribe—and I have seen something of almost every tribe east and west of the Rocky Mountains—that have not some curious games of chance. Along the coast the stakes are usually strings of shells, and the game played is called met-ala. It is played with the four incisor-teeth of the beaver, engraved much after the fashion of our dice; but, instead of being thrown from a box, they are sent broadcast from the hand, on a deer

or bearskin spread on the ground. Slaves, dogs, horses, and even a man's wives, are frequently lost at this game. There is a beautiful set of these gambling-teeth in the Ethnographical Room of the British Museum, as well as strings of the dentalium, as strung for money, so that any person who may be curious on the subject can easily see them.

The intrinsic value of the shell, as an article of barter, entirely depends upon its length; and the question as to whether the shell when procured shall, figuratively speaking, represent a sovereign or a shilling, is calculated by the Indians in this way:—If twenty-five shells placed end to end measure a fathom or six feet in length, these twenty-five shells, when strung together side by side, are called a *hi-qua*. The squaws string them very neatly. A small bit of dried sinew, taken from the suspensory ligament of the reindeer (here called the caribou), is passed through the shell, there being, as I have already said, a hole at each end. These transverse pieces of ligament are made securely fast to two lateral or side-cords, which side-cords are fastened together at each end; so that the string of shells, when complete, is like a ribbon made of holding-teeth. The string is generally ornamented most elab-

borately with fragments of nacre from the haliotis shell, and tufts of dry wool taken from the mountain-goat (*Capra americana*).

The short, broken, and inferior shells are strung together in the same manner, but in various lengths, and represent shillings or pence, as the string is either long or short, or the shells defective. All inferior strings, irrespective of either length or quality, are called kop-kops. The *hi-qua* represents the sovereign, the highest standard of currency, and, as a rule, would purchase one male or two female slaves. The value of the slave, estimating it by the sum paid in blankets for a slave at the present day, would be about 50*l.* sterling. Forty kop-kops equal a *hi-qua* in value, but various small bargains are made, and small debts paid, with kop-kops, only just as we pay away shillings, or lesser coin.

Since the Hudson's Bay Company have established trading-stations along the coast, at the north end of Vancouver Island, and on the main rivers inland, both east and west of the Rocky Mountains, blankets and beaver-skins have become money, so to speak, and the medium of exchange. If you bargain with an Indian in the interior to do any service, you agree to give him so many skins, either per diem, or as a fixed price for the work that is

to be done; but in making this agreement, it is not understood that the employer must really pay so many beaver-skins. What is meant is this—that the Indian gets an order from you on the trading-post of the Hudson's Bay Company, for goods equal to the value of the beaver-skins you contract to pay him.

Every article given in exchange by the Hudson's Bay Company is calculated according to the value of beaver-skin, and as beaver may be either plentiful or scarce (or, in other words, dear or cheap), so are goods bartered for fur calculated as to value. Bears, foxes, otters, martens, fishers, and lynxes are respectively worth so many beaver-skins each, or, beaver being dear, it will require two marten-skins to equal a beaver. Then, as a blanket is worth so many beaver-skins, or as a beaver will pay for so many charges of powder or strings of beads, the beaver becomes the standard of value. If you buy a horse, a dog, a wife, or a salmon, you contract to pay so many skins. On the seacoast, where the savage and the paleface have seen much more of each other, the rate of service is now generally asked for in blankets, shirts, or the 'almighty dollar.'

But in early days, ere the red and white men

knew each other, the dentalium was the only currency in use. It is quite clear, and also a very curious fact, that the hi-qua and kop-kop were known and used by the Indians of the interior at some distant period, although no trace of their use, or knowledge of the shell, exists among them at present; for in digging out some flint implements, stone beads, and other things I need not here enumerate, from the drift, I found numbers of dentaliums and round buttons made of the *Haliotis nacre*. The distance from the nearest seaboard was about a thousand miles, and the language spoken by these inland Indians quite incomprehensible to the Indians on the coast. But as I have more to say about the various tribes occupying North-west America, I shall here only explain the system adopted by the Indians to capture the money-shells.

An Indian when shell-fishing arms himself with a long spear, the haft of which is light deal; to the end of it is fastened a strip of wood placed transversely, but driven full of teeth made of bone; the whole affair resembles a long comb affixed to the end of a stick with the teeth very wide apart. A squaw sits in the stern of the canoe, and paddles it slowly along, whilst the Indian with the spear stands in the bow. He

stabs this comblike affair into the sand at the bottom of the water, and after giving two or three prods draws it up to look at it: if he has been successful, perhaps four or five money-shells have been impaled on the teeth of the spear. It is a very ingenious mode of procuring them, for it would be quite impracticable either to dredge or net them out; and they are never, as far as I know, found between tide-marks.

CHAPTER II.

PIGMY OR MEDICINE OWL AND NEST—SUPERSTITIOUS DREAD OF INDIANS—GOLDEN-CREST AND ITS CRADLE—RUFFED GROUSE.

THE PIGMY OWL.

Glaucidium Gnoma, Wagler; *Strix passerinoides*, Tem.; *Strix infuscata*, Tem.; *Glaucidium Californicum*, Schlater; the Medicine or Death Owl of the North-west American Indians.

THIS rare and beautiful little owl, the smallest of all the North American species, I shot for the first time on Vancouver Island. It has also been obtained, though rarely, in Oregon, Washington Territory, and California.

The habits of this tiny bird appear little known. Its diminutive size, shy solitary habits—for it always hides amongst the thick foliage of the oak or pine, except when feeding—renders the task of observing it, or obtaining a specimen, at all times difficult; hence a few dried skins, from which its generic and specific characters have been determined, are the only specimens we possess. How

the recluse lives, where it lives, or what it does, are secrets.

Early in the spring, whilst collecting the migrant, birds which arrive at Vancouver Island in great numbers and variety of species—some to remain the summer through, others only to rest awhile as they journey farther north to their breeding-grounds—Dame Fortune, fickle though she generally be, deigned for once to smile, and afforded me an opportunity to watch the habits of the Pigmy Owl. Two of these strangers selected as their home a gnarled and twisted oak (*Quercus garryana*), that grew alone on an open patch of gravelly ground near a small lake. Close by this lake were the remains of an Indian lodge, that had been once used as a fishing-station, affording me a capital place of concealment wherein to watch the manners and customs of these—to the aborigines—potent and much dreaded spirits.

My camp was not far away, thus enabling me to reach my hiding-place at the first blush of morning. No sooner did the rosy light creep down the valley and spread over the plain, than the owls were up and stirring—evidently hungry from a night's fasting; for, like a well-conducted couple, they retired early to rest.

Their flight—short, quick, and jerking, similar to that of the sparrowhawk—is quite unlike the muffled noiseless flap of the night-owl, as it sails along over marsh and meadow in pursuit of mice, lizards, or any benighted rodent that has incautiously strayed from its place of safety. The food of this little owl is entirely insectivorous, its favourite morsel a fat grasshopper or field-cricket: not that it by any means refuses or objects to breakfast on an early riser, be it beetle or butterfly, that, like the proverbial worm, is so devoid of prudence as to permit the ‘early bird’ to gather it.

When in pursuit of food, the owls perch on a small branch near the ground, sit bolt upright in an indolent drowsy manner, until their quick eye detects an insect moving on the plain; then they pounce suddenly upon it, hold it down with their small but powerful claws, and with their sharp beaks tear the captive to pieces. The hard wing-covers and thighs, if a cricket, or the wing-shields if a beetle, are rejected, only the soft abdominal parts being eaten. Hunger satiated, they return to their tree, and, cuddling lovingly together, sit and doze away their time, protected from the blazing rays of the midday sun by the foliage of the sturdy oak.

Their breakfast disposed of, I used to abandon my post, and, like the owls, eat and sleep under some shady covert.

As near as possible to the mergence of twilight into night—what the Scotch call the ‘gloaming,’ and in our country is known as ‘cock-light’—when the woodcock skims through the grove and the blackbird chink-chinks his vesper hymn—exactly at this time the owls invariably came out; and, as if for the purpose of stretching their wings rather than feeding, took erratic flights round the tree, and up and down the plain, chasing one another, and performing all kinds of inexplicable manœuvres. Occasionally they settled on the ground, but never remained long. I do not think they ever capture an insect whilst it is on the wing, and a very small quantity of food appears to satisfy their wants. As it became dark, having supplied their evening necessities, they again returned to their dormitory, and, as I imagine, slept away the night.

In their habits they appear to have nothing in common with the typical owls (*Striginae*), and approximate, though slightly, to the day-owls (*Nycteininae*). Cassin, in his ‘Birds of California,’ calls this owl *Glaucidium infuscatum*, regarding it as the *Strix infuscata* of Temminck. Dr. Sclater, however, proposes to call it *Glaucidium*

Californicum.* There can be no doubt that the two names, *Strix infuscata* and *Strix passerinoides*, were used by Temminck to designate the same species, which is strictly from South America, and quite distinct from our little friend, though closely allied. The name *Glaucidium gnoma*, used by Wagler, I adopt as having precedence.

Its specific characters need not be given here, being readily obtainable by referring to any of the list of works quoted in the synonyms. I may mention, however, that the grand and marked specific differences, as distinguishing this from the South American species, are that in *G. gnoma* the toes are naked, the colour generally lighter, and the size somewhat less. Total length of male, 7 inches; wings, $3\frac{1}{2}$ inches; tail, 3 inches. The sexes are very nearly alike, but the female is rather the larger, and more thickly spotted with white.

Early in May two small eggs were laid—round, and very rough on the surface—a large knot-hole in the branch of the oak being selected as the nesting-place. Not a particle of anything was used as lining, the eggs being deposited on the bare wood. The length of time occupied in incubation I regret inability to state, having to shift my camp some distance away soon after the

* 'Proceedings Zoological Society,' 1857, page 4.

female commenced sitting. When next I visited the tree, both young and old were gone, much to my disgust and annoyance. By the scattered feathers, that lay ominously beneath the tree, I imagine a prowling martin or fisher had played havoc with my pet family, and devoured, perhaps, both parents and children.

The Indians, without exception, hold this little owl in terrible dread. To see one in the day, or to hear its feeble cry, not-unlike a stifled scream, is a fatal omen to brave or squaw; the hearer or near relative is sure to die ere the end of the moon. To kill one is an unpardonable heresy. I nearly got into very serious trouble for shooting a specimen of this little owl. An Indian deputation, headed by their chief, waited on me, and protested against my risking theirs and my own inevitable destruction. All reasoning was futile, and there was nothing for it but to procure all the mystic birds and mammals by stealth.

It is a curious fact that owls, in every part of the world, have always been deemed birds of ill-omen. The crumbling ruins of an ancient monastery, the old tower in the ivy-clad castle, and the ghost's chamber in a haunted house, are invariably associated with owls and goblins.

Pliny, in his 'Natural History,' when speaking

of birds of evil, says: 'The owl is a dismal bird, and very much dreaded in public auguries; inhabits deserts that are not only desolate, but dreary and inaccessible; it is a monster of night, nor does it possess any voice but a groan.'

Virgil alludes to it as foreboding the death of Dido:

*Solaque culminibus ferali carmine bubo
Sæpe queri, et longas in fletum ducere voces.*

Shakspeare, too, saddles this poor bird with the guilt of ominous predictions.

Cæsar, in alluding to the events preceding Cæsar's death, says:

*And yesterday the bird of night did sit,
Even at noonday, upon the marketplace,
Hooting and shrieking.*

In Egypt, in bygone years, if the Pacha presented a gentleman with a drawing or any representation of an owl, it was meant as a polite hint, to the recipient of the gift, if he did not dispose of his own life, the powers supreme would save him the trouble. More modern poets rarely scandalise or malign the owl's character. As knowledge of the physical sciences has become diffused, so the mists of superstition have vanished, and modern writers, even in poetic composition, truthfully allude to its habits.

Coleridge, in 'Christabel:'

'Tis the middle of the night by the castle clock,
And the owls have awakened the crowing cock.

Again, Longfellow, in 'Hyperion,' speaks of the owl 'as a monk that chants midnight mass in the great temple of Nature.'

With every Indian tribe I have ever met with, either east or west of the Rocky Mountains, the owls, whether large or small, are always held sacred—their feathers being worn as charms by the medicine-men or conjurors of the tribes. It is perhaps fortunate for the owls they are so dreaded. There are many Indian traditions I could relate, where terrible calamities have invariably followed the warnings of the Pigmy Owl, but space forbids.

Why such an exquisite type of Creative Wisdom—beautiful in plumage, retiring in habit, harmless, and gentle—should inspire terror and aversion, are mysteries I must leave to wiser heads than mine to solve.

Hardly has the snow left the hillsides and sunny slopes, and whilst deep patches still linger in the valleys and shaded spots; when early spring-flowers peep out, here and there, from some sheltered spot, and the bursting buds but faintly reveal the leafy treasures hidden within their

horny casings—the sloppy transition state, when summer has not come, and winter has not gone—then it is our eyes, and hearts too, are gladdened by the appearance of flights of birds; some passing on, others remaining to build, rear their fledglings, and enjoy the northern sunshine. One of the earliest migrants is the Golden Crest (*Regulus satrapa*.) They are the most sociable of birds, and evidently are fond of good society, and plenty of it, until their domestic duties demand a certain period of seclusion. Then the tiny faithful couples leave their restless friends, as their friends also leave each other; by-and-by to join together again, reinforced with hosts of Misses and Masters Wren, to indulge in arboreal revels, until the rough autumnal winds bids them depart for the more genial and sunnier south.

The Golden Crests are always, except during the nesting-time, in company with the Tits and Nuthatches. Flocks, consisting of fifty or sixty, may be seen, completely making the round of a prairie, travelling along from bush to bush; sometimes ascending into the pine-trees, at others clinging to the slender stalks of grass and wild flowers, even their diminutive forms bending the fragile support to the ground—

ever singing, chattering, quarrelling, but never resting. It is a pleasant sight to watch this army of insect-hunters, climbing back downwards, peering curiously into every crack and crevice under the leaves, and into the flowers. Concealment is of little avail to the insect; sharp eyes spy him out, and sharper beaks nip the idler, and drag him from his lair. Often a moth, or other winged insect, takes refuge in flight, when surprised in his nest; then a host of nimble pinions dart after the fugitive, and, spite of twists and turns and angular efforts to escape, tit or golden-crest catches him, and, descending to the ground, himself pursued by his fellow-hunters, picks off the gay wings and legs of his prize, then swallows the dainty but limbless morsel.

There are few more skilful architects than the Golden Crest. The place selected for the nest is generally at the end of a pine branch, where, like a cradle, it is rocked by every passing breeze; but so ingeniously is the nest contrived, that, rock and swing as it may, neither eggs nor young can ever be jerked out. The nest is tightly woven, and composed of twigs, moss, lichen, fronds of the larch, and dead leaves; a structure, when completed, exactly resembling the branch of the tree to which it is really

lashed, with ropes of vegetable fibre. The fronds of the fir form admirable sunshades, or umbrellas, as circumstances may require. The inside is lined with feathers, soft hair, and spiders' web—the web seems used for the purpose of warping the other materials tightly together; a partial dome covers the top, under which is the entrance-hole. The circumference of the nest is about nine inches. Six is about the usual number of eggs laid.

In the valley of the Columbia the golden-crests begin building in June, and on Vancouver Island somewhat earlier. Tits and nuthatches generally nest in holes, in the same tree the wren selects for her pendant nursery.

The general colouring of this handsome little bird is yellowish-olive inclining to green, the head being crowned with a tuft of bright golden-orange feathers. Their song, soft and mellow, is trilled out nervously, like the tremulous notes of young Lady shak, on her first vocal performance.

A very frequent companion of the Tits is the Ruby-crowned Wren (*Regulus calendula*), somewhat larger than the Golden Crest, of a brighter green on the back and neck, and more yellow under the wings. The crown, instead of being orange, is bright scarlet. I met with it on both slopes of the Cascades. It resembles the golden-

crest in all its habits, and builds a very similar nest. The young have no crest until the second year after leaving the nest. These birds are rarely seen in the summer during the breeding-time, as their haunts are seldom accessible to man.

I have already spoken of the Sumass and Chilukweyuk prairies. Whilst camping there I had abundant opportunity to watch the habits of many curious residents in these prairies and their adjacent forests of pine:—

THE RUFFED GROUSE—OREGON GROUSE—PARTRIDGE, PHEASANT.

Bonasa Sabinii, Baird; *Tetrao umbellus*, Richardson, F.B.A.

This grouse has an immense geographical range: west of the Rocky Mountains, from the borders of California, throughout Oregon and Washington Territories, extending high up on the slopes of the Rocky Mountains; plentiful in all the timbered land between the Cascades and Rocky mts along the banks of the Columbia, over the ridge of the Cascades, down their western slopes to the Fraser, on all the islands of the Gulf of Georgia, and everywhere on Vancouver Island to its extreme north end, and on the mainland north to latitude 53°. East of the Rocky Moun-

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tains, its very near relative, *Bonasa umbellus* (Steph.), again ranges through Canada—indeed, I may fairly say, over the greater part of America. But what follows applies to Baird's new species, found only west of the Rocky Mountains.

The habits of this grouse are singularly erratic, and his food is of the most varied character. In the spring-time his favourite haunt is by the side of some stagnant pool, or in the brush round a marsh where the crab-apple (*Pyrus rivularis*) and the black-birch and alder grow, where fallen timber lies crumbling and rotting away; where everything mouldy, dark, damp, and oozy seems to hold high festival; where flabby fungoid growths spring like huge ears from moist-decaying wood, and gigantic agarics sprout up in a night like mammoth fairy tables; here, too, the skunk cabbage, with its great green succulent leaves, grows in rank luxuriance, covering up the surface of the mud like a huge mat.

In such spots as these, in the month of April, the wooing begins. They regularly pair, and having once exchanged the nuptial promise, are, I think, most constant to each other during the nest-building and hatching time. During the time of pairing, and at intervals after the

chickens are hatched, the male produces that extraordinary sound called 'drumming.' Again and again have I sat and watched the proceeding. There is a solemn quiet—an almost deathlike silence—pervading these mighty wilds of the far North-West, unlike anything we can conceive where the hand of civilisation has been busy. The bird squats on a log or fallen tree, motionless, as though it had no life; suddenly, all the feathers are, as it were, reversed; tail erect, like a strutting turkey-cock; the ruff round its neck stands out, stiff and rigid, and the wings droop on either side of the log as if broken. They slowly vibrate, and then produce a sound, loud and clear, like the thrum of a double-bass string; faster and faster it comes, as the wings move with greater rapidity, until the beats have no distinctness, and the sound has become a throbbing hum. He suddenly ceases, and after a few minutes' rest goes through the same performance.

Perhaps the stillness I have referred to induces one to imagine the sound to be louder than it really is; but if one did not see the bird, and did not know whence the sound came, a fertile brain could easily imagine it some demon drummer in active employment. For what purpose this sound is produced I am by no means clear:

whether it is to intimidate the cocks and keep them off, or whether it is to proclaim his near proximity to the hen, or whether it is a sexual performance to demonstrate his love and devotion, are matters that the bird alone can answer. If he knew how constantly the sound betrayed him to the crafty savage, I rather think he would adopt a more silent system. Guided by the drumming, the redskin creeps like a weasel through grass and bush upon the unsuspecting bird, and, sending an arrow whistling through its ribs, or half a dozen buck-shot from an old trade-gun, thus stops his fun, and 'turns his thoughts from mirth to gravity.'

I have often seen cocks fight furiously during the pairing season, and their manner of adjusting their little differences is much after the fashion of our gamecocks. That old maxim, 'None but the brave deserve the fair,' is evidently a great grouse principle. Ruffing up their necks, head and back almost in a straight line, tail up, legs stiff, and wings dropped, they circle round and round each other, striking and pecking until the vanquished hides anything but his diminished head, and the victor bolts upon a log and drums furiously.

The nest is complete about the end of May. It

is always placed on the ground under a fallen log, or at the foot of a bush; and is composed of a quantity of dead leaves, lined with dry grass, bits of moss, and a few feathers. From ten to fourteen eggs are about the average number I have found; in colour, dirty white, without any spots, or freckles of darker brown. I think I must have found at least ten nests in one swamp, near the Spokane prairies, *en route* to the Rocky Mountains.

The moment they are clear of the egg, the chickens leave the nest and follow the mother. She calls them with a kind of clucking sound just like a hen, and covers them when resting. Like most of her tribe, the mother uses all kinds of feints and stratagems to lure an intruder from her young. I have seen an old hen ruffed grouse flutter along close to my feet, as if her legs and wings were entirely disabled, allowing me to almost put my hand upon her; having thus decoyed me on and on, until her chickens had time to conceal themselves, she would dart suddenly off, I daresay thinking how cleverly she had 'fooled me.' It is a curious thing that this grouse when frightened rises with a loud rattling noise, but when it rises of its own free will, it is as noiseless as the flight of an owl. I have often, when lying down watching them, seen the

birds rise and fly upon a tree without a sound; but only walk up to them, and a sharp whirring noise is invariably produced when they flush. As soon as the chickens can follow, the dark swamp-brush is abandoned, and the favourite locality is an open hillside; especially if a mountain-burn comes brawling down among the rocks, resting here and there in coy little pools—drinking-fountains of Nature's own contriving. Here too grass-seeds, berries, and insects are in abundance, and the woolly little chickens feed right royally.

They never, like the sharp-tailed grouse, pack, but almost invariably keep together in broods; they love to frequent trails or sandbanks, where they can dust themselves. They are bitter enemies to ants: having a weakness for the eggs, they scrape and scatter to the winds their little wood-piles, the toil and labour of hundreds of busy architects, sending the building material flying far and wide, until the egg-treasury is reached, and ruthlessly despoiled.

From September to Christmas the 'white-flesher' (for so he is named) is at his best, having had the full benefit and advantage of the berry and nut season; his flesh is pure white, and he is most delicious before he begins to devour the leaves of the fir; this he does as soon as the

snow shuts him off from any other kind of living, and he then acquires a flavour of turpentine, which is anything but agreeable. Nice as he most unquestionably is for the pot, he is not a bird a sportsman would love. His system is to perch on the nearest branch; and so accurately does the plumage resemble the lichen-covered bark of the trees, that it is difficult and often next to impossible to descry him. His habit when perched, if at all alarmed, is to crouch down the long way of the branch, the head and neck extended to the utmost, and the throat pressed tightly down; when in this position, although the bird has been close to me, I have been unable to see him; and when you have fairly made him out, it is very difficult to shoot him. 'Shades of my grandfather!' I hear some gunner say, 'what, shoot a grouse on a tree!' Again I say, Yes. I wanted him for the pot, or his skin, or maybe for both. But, let me tell you, he can fly if he likes, and I know no grouse more strong or swift on the wing than the ruffed grouse, when it suits his humour to go. I have had several spurts of good shooting with this same white-flesher on the Sumass and Chilukweyuk prairies, and at other places west of the Cascade Mountains, on the banks of the Fraser river.

It was in October, and the snow was just beginning to mantle the hilltops in the livery of the Frost-king, warning bird and beast that it was time to retire into valley-quarters for winter. The grouse had come down from the hills, and were lying in the long prairie-grass, about a rifle-shot from the edge of the bush. They rose before my dog singly, and went off to the covert like a ball. I had No. 5 shot, and I soon found I could not venture to let them go very far. I made, however, a very fair bag, finishing off with some mallard and bald-pates, as I recrossed the prairie to my camping-ground.

A great qualification in an Indian or trapper's dog is 'to tree a grouse;' the dog flushes them, and the grouse perch at once upon the branches just above the dog's head, and peer down stupidly at him, craning their long necks to get a peep at the intruder—thinking, doubtlessly, what a rare and curious animal it is. The dog, looking up as the fox did at the crow in the fable, barks and yaps with all his might; this induces the gunner to come and see what it all means, and he too spies the grouse. If care is used to shoot the under birds, often three or four may be killed before the others are sufficiently awake to their danger to fly off.

CHAPTER III.

THE STORE-KEEPER—APLODONTIA L. PORINA—AMERICAN DIPPER.

THE STORE-KEEPER.

(*Tamias quadrivittatus*.)

ONE of the liveliest, prettiest, merriest, and, to judge from appearances, the happiest little animal one meets with in North-western wilds, is a tiny squirrel, known and feared by the Indians, who have a name for it, unpronounceable by any mouth of ordinary conformation; and to attempt writing it is only to give a long list of double and single letters, the type-pattern for spelling Indian words. For example,—*ch-a-ta la-ch*,—what can you make of that? Corkscrew the word out, giving it all the throat-sound and tongue-twisting you can manage, and it has as little resemblance to the name, as rolled out from the larynx of a redskin, as the wheeze of a bagpipe has to the clear, rich, mellow note of the mocking-bird.

To the scientific world my furry friend is

known as *Tamias* (nearly as bad as Indian); *tamias* being Greek for 'store-keeper,' the generic title. The specific name tells us that he has four stripes, or 'ribbons,' marking his skin. The Missouri Striped Squirrel is the familiar appellation of the white settler; the Ogress Squirrel of the savage—why so named will be shown in the sequel.

The specific characters are, briefly:—Tail quite as long as the body; a grey stripe along the top of the head, joining two others passing below the eyes; a hoary patch behind the ears; general colour, deep ferruginous red; back marked with four equidistant stripes, nearly black, extending from the neck to the tail; length four inches, without the tail. Incisors (cutting-teeth) strong, and deep orange-colour on the outer surface; on each side of the mouth is a large pouch, opening just anterior to the molar teeth, and extending back to the shoulder.

In these capacious sacks, seeds, bits of favourite roots, indeed anything either eatable or storeable, is carried to the 'store-keeper's' residence. The pouches are filled from the mouth; the forefeet being used, much the same as hands, to press the cargo back, and tightly pack it. When emptying them, the forefeet are again called into requisition; placed behind the corpulent bags, the

contents are pressed out by a kneading kind of movement.

Where a more striking evidence of Divine wisdom and forethought! But for these leather bags, it would be utterly impossible for this little animal to carry in a store of provisions sufficient for his winter supply. He does not sleep, like the 'Rock Whistler,' and live on his own fat, but only *partially* hibernates; and hence needs a stock of food, with which he provides himself during the sunny summer days.

His mansion is usually under a fallen tree, or amidst the tangled roots of the giant pines. A small burrow neatly dug, and round as an augur-hole, leads in a slanting direction to an open cavity, neatly lined with dry leaves, blades of grass, and moss—a bed soft as eider-down, wherein the 'store-keeper' sleeps. In an adjoining opening, on a kind of earthen shelf, is his store, neatly piled away, to be carefully hoarded, until the biting blasts of winter, sweeping through the forests, stripping land and tree alike of their verdure, warn the provident workman to retire into his snug quarters, not to shiver, cold and hungry, until the spring-time comes, and bids the flowers ope their blossoms, and the buds burst into leaf. Not a bit of it: his industry has provided not only a snug residence, but food in abundance, to supply his

daily necessities—a garrison in which he can defy wind, rain, frost, and snow, and bide his time until the Ice-king yields his sceptre to the genial ruler of the summer.

This squirrel seems to live everywhere. Wander round the margin of the emerald-green prairie, and there, amidst the hazel, mohonia, vine-maple, and various shrubs that love the sunshine, the 'Store-keeper' is sure to be seen, skipping along on a dead stick, or scudding through the bushes; stopping continually to have a peep at the intruder; sitting bolt upright, with its tail erected, defiantly chattering angrily, in a kind of half-laugh, half-bark; then uttering a shrill chirp, a danger-signal to others, then makes for its hole and disappears. Paddle in a canoe down the surging stream, past the piles of driftwood, heaped mountains of dead trees; and as the frail bark shoots by, you are certain to see the 'Store-keeper' scampering from log to log, his scolding and whistling lost in the noisy rush of the torrent. Dive into the dark shadow of the pine-forest, where mouldy life holds high festival—where huge fungoid growths and giant agarics spring in flabby clusters from the oozy logs—where the pools, thick and slimy, are covered with the green fleshy leaves of the

'skunk cabbage,' and each branch and spray, draped with the black lichen (*Lichen jubatus*), seem mourning over death and decay on every side—in these damp solitudes lives the 'Store-keeper,' merry and quarrelsome, as in brighter scenes. Climb the mountain-side, and scramble through the rock-walled ravine, where the pine clings to the stones rather than grows from their clefts; where no murmuring streamlet cools and refreshes thirsty Nature, or breaks the solemn silence with its rippling music; and not even the footfall of the savage disturb its echoes; and naught living, save the denizens of the air, that peep into its weird depths from the tree-tops, ever visits it: yet in the very loneliest of these glens the 'Store-keeper' is sure to be met with. Climb on—higher, higher—to the perpetual snow-line, marking the boundary betwixt life and icy desolation; and there too, on the very frontier, he bounds, and jumps from rock to rock, ever scolding, laughing, whistling, and toiling, to garner in his harvest.

Two of them, husband and wife, took up their abode in an old sawpit, close to our winter-quarters, at Fort Colville; and there constructed a nest, during the month of July, for the mamma to bring forth and rear her offspring in. I

carefully watched them from day to day, and, with the exception of an occasional scolding, they took little heed of my presence. A hollow place was first cleared under one of the cross-timbers of an old sawpit; then both worked hard, bringing blades of dried grass, leaves, and moss. I observed they carefully collected fragments of rag, and pieces of paper left by the sawyers; so, to gratify this taste for the use of novel material, I brought out continually small bundles, composed of coloured threads, rags, paper, fragments of scarlet cloth, and small portions of gold and silver lace from my fishing-tackle stock. All these were greedily seized on, and woven into the nest, which, when completed, after about sixteen days' work, presented the most extraordinary appearance imaginable. Such a nuptial nest no squirrel ever had before, or, perhaps, will ever have again. I am sure they were proud of their achievement, and deemed it a triumph of squirrel architecture!

The family in due time came into the world; but any attempt to approach the nest was resented so furiously, yet combined with such evident terror for the safety of their babies, that I had not the heart to gratify my curiosity to see how many there were, and what they were like.

Nearly three weeks passed, when the love of prying overcame all other scruples, and a peep into the snug, cosy, chequered retreat was irresistible. Separating with the utmost caution the walls of the entrance-hole, three baby-squirrels were visible,—such queer little animals, they seemed all eyes and tail. The papa and mamma were both loud in their remonstrances, and frightfully angry at the impertinent intrusion; but as I did not touch the infants, and, as far as practicable, mended the torn entrance, why, it appeared to me there was not much ground for complaint.

Visiting my pets on the following day, imagine my surprise at finding the nest empty, and the old and young vanished together. First I thought some poaching weasel had murdered the innocents; but no—the old ones had carried them away into some other retreat, because I had looked at them, and meddled with the nest. Instinct here appears vastly near akin to reason; what had happened once, the ‘Store-keeper’ evidently *thought* might occur again, and wisely took the precautionary measure of concealment, selecting a spot unknown to the intruder.

Its name, ‘Ogress Squirrel,’ arises from a singular Indian tradition, that I think is quite

worth repeating, as it shows us how readily uncivilized man seizes on the supernatural to account for everything beyond his comprehension. Spiritual agencies and wild myths form subjects for the daily chat round the lodge-fire; everything becomes mysterious that is not understood; the very language of the red-man is a tangled chaos of symbols, figures, and metaphors. A prominent performer in all their legends is a terrible old woman, half witch, half ogress, of very doubtful reputation, armed with teeth like a wolf, and the claws of a grizzly-bear; her entire time spent in doing evil, eating children, and waging unceasing war on the good and virtuous.

To make the story brief, it seems this amiable old lady (at some period far away in the dim history of the past) spied a fat dainty young 'redskin,' the son of a brave and good chief, playing by the side of a mountain-burn, not far from the wigwam of his parents. With wily words of endearment, and holding out a basket filled with ripe berries and gaudy flowers, the witch-woman coaxed the baby-savage within reach of her terrible claws: as she clutched it, the father and mother saw their loved one's peril, too late to rescue, to save, beyond all

human power. There was but one chance, one last frail hope to cling to: falling on their knees, both prayed, and, in the agony of despair, besought the 'Great Spirit' to use his power and save their child—give it back to them, or change it into any form, so that it escape the teeth and talons of the dreaded ogress. The prayer was heard, and the boy, assuming at once the form of a tiny squirrel, deftly slipped from out her grip, but not unscathed; the marks inflicted by four of her claws remain to this day on its *back*, as evidence of the story's truthfulness.

Hence it is that Indian boys seldom kill this squirrel, ill-luck befalling all such profane transgressors, and that 'medicine-men' (the doctors and conjurors of the tribes) wear its skin as a potent and all-powerful charm.

The 'Store-keeper,' bearing on its back the marks of the wicked old woman's finger-nails, may be seen by any who choose to visit the British Museum, where a specimen I shot is set up very near the 'rock-whistler.'

THE DIPPER.

(Hydrobata mexicana.)

Like the well-known gallinule, or water-hen (*Gallinula chloropus*), the dipper swims and dives with great facility; the plumage, close and compact, is similarly adapted to resist moisture—a wise provision, enabling the bird to remain a long period in the water without becoming wet. It resembles the starling in the form of the beak, falcate wings, mellow song, and feet, constructed on the type of ordinary perchers; bill without any bristle at the base, somewhat long and slender, and bent slightly upward; the culmen concave towards the tip, which is notched and curved; feet and legs strong, claws large, lateral toes equal; tail very short.

The colouring of the British dipper's plumage, though somewhat inclining to the sombre, is nevertheless chaste and pretty. The crown on the upper parts of the head and neck shades imperceptibly away into the velvet-black of the back, scapulars, and wing-coverts. The breast, front part of the neck, and throat are snowy white; a rusty-brown line separates it from the

black. The legs are somewhat short, but very strong; the claws considerably curved, to prevent slipping.

Of most hermit-like and exclusive habits, the dipper loves to linger amidst the wildest solitudes of Nature, frequenting streams that push their headlong way through mountain-glens, or wind in tortuous course over the heather-clad moorland. It may, too, occasionally be seen briefly resting on the dripping spokes of the wheel when the mill stops, its low plaintive warble faintly heard above the splash of the water.

Every angler must be familiar with the dipper's song, always a welcome strain—not loud, but exquisitely sweet and melodious. Except during the breeding season, it rarely happens that two are seen together; they pair very early, and, before the ice is gone from the streams and pools, in the month of February, their nuptial choruses (as they fidget about, perched on a boulder, dead log, or projecting rock, bobbing their heads, or dipping) herald the coming spring. In the selection of their nesting-place they exhibit great diversity of taste. It may be placed in the cleft of a rock, in a ruined wall, among a mass of tangled roots, under a bridge,

close to a milldam, but always near running water. One I knew of was under a rude bridge on Dartmoor, wedged between two granite boulders; another by the side of a milldam in Cornwall, a third amongst the timbers of an old salmon-trap.

The dippers are most restless and active in their habits: ever flitting from spot to spot, always on the move, diving into the stream, out again—steadfast in nothing but continual change. The most singular trait in their versatile character is a power they possess, enabling them not only to remain for a long time under water, but walk about on the pebbles or gravel at the bottom of streams or pools, in search of larvæ and aquatic insects, just as a man in a diving-dress seeks for lost treasure round the hull of a sunken ship.

The late and ever-to-be-lamented naturalist, Mr. Waterton, thus commented on this most curious habit:—

‘This is the bird whose supposed subaquatic pranks have set the laws of gravity at defiance, by breaking through the general mandate, which has ordained that things lighter than water shall rise towards its surface, and that things that are heavier shall sink beneath it. If the water-ouzel,

which is specifically lighter than water, can manage, by some inherent power, to walk on the ground at the bottom of a rivulet, then there is great reason to hope that we, who are heavier than air, may any day rise up into it, unassisted by artificial apparatus, such as wings, gas, steam, or broom-staff.'

Although the feet are strictly those of a percher, still the dipper can swim like a duck, and as I have often seen a diver spread its wings, and literally fly when under water; so this bird, in order to escape, if suddenly alarmed, frequently goes a long distance down-stream, using its wings beneath the water, much in the same manner as it would if flying through the air.

The poor little dipper has many terrible and implacable enemies; they saddle him with crimes and offences against the fisheries that he does not deserve, brand him as a poacher, offer rewards for his head, and ruthlessly take his life. Farmers, gardeners, gamekeepers, and managers of fisheries, actuated, I doubt not, by the purest motives for good, are nevertheless too prone to nail their best friends to the barn-door. Destroy the feathered police, and hosts of insect marauders, that laugh at guns, traps, poison, or rewards, will most surely mow down

your fields and forests, and play havoc with your fisheries into the bargain.

Believe me, it is not with any felonious intent that the dipper visits the spawning-beds. He would not give a chirp to breakfast on the daintiest fish-eggs that speckled trout or silver salmon ever laid. Fat larvæ, plump savoury water-beetles, and delicate young freshwater molluscs, are his delight; and he knows well the weakness such robbers have for new-laid eggs, and, like a sensible bird, goes where the eggs are, to find them—an obedience to instinct that often costs him his life.

I have opened the stomachs of dozens of dippers, when collecting for the purpose of Natural History (not only in this country, but in the United States, British Columbia, Texas, and Oregon, where all the streams are alive with salmon and trout), and never in a single instance did I discover other than the remains of insects and freshwater shells.

A Highland clan, a weed, and the ouzel are severally classed, in a quaint old distich (quoted in the 'Dictionary of Animated Nature'), as the direst enemies of the Moray. Thus it runs:—

The Gordon, the guile,* and the water crow
Are the very worst ills the Moray ever saw.

* Guile, a weed destructive to corn-lands.

I have thus referred to the English dipper to introduce its very near relation, inhabiting the far North-west. It, too, eschews all sociable communion, disdaining the slightest approach to a gregarious life except when mated, choosing invariably wild mountain-streams, where, amidst the roar of cascades, whirling eddies, and swift torrents, it passes its lonely life.

The American dipper (*Hydrobata Mexicana*) ranges from the coast to the summit of the Rocky Mountains. I have killed it at an altitude of seven thousand feet above the sea-level. In size it very nearly resembles the European bird, but differs greatly in colour; being of a uniform plumbeous grey, the only markings a minute spot above the anterior corner of the eye.

I once found the nest of the American dipper built amongst the roots of a large cedar-tree that had floated down the stream and got jammed against the milldam of the Hudson's Bay Company's old grist-mill, at Fort Colville, on a tributary to the Upper Columbia river. The water, rushing over a jutting ledge of rocks, formed a small cascade, that fell like a veil of water before the dipper's nest; and it was most curious to see the birds dash through the waterfall, rather than go in at the sides, and in that way get behind it.

For hours I have sat and watched the busy pair, passing in and out through the fall, with as much apparent ease as an equestrian performer jumps through a hoop covered with tissue-paper. The nest was ingeniously constructed, to prevent the spray from wetting the interior, the moss being so worked over the entrance as to form an admirable verandah.

Mr. George Gibbs ('Natural History, Washington Territory,') speaks of two he noticed whilst gold-washing on the Salmon river: 'As I sat at my cradle on the bank, a pair of dippers, which I suppose had their nest hard by, or perhaps, as it was July or August, had already hatched their brood, used to play in the water near me, sometimes alighting at the head of a rapid, allowing themselves to be swept under, and then rising below. They dive with great celerity, and at times beat the water with their wings, throwing the spray over themselves. Their whistle was sweet and rather sad, but they seemed very happy and busy fellows notwithstanding, and in nowise afraid of the harsh rattle of the "miner's cradle."' "

CHAPTER IV.

NATURE OF COUNTRY FOLLOWING THE 49TH PARALLEL FROM THE GULF OF GEORGIA TO THE SILMILKAMEEN—GIANT TREES—SUMMASS PRAIRIE AND LAKE—NORTHERN SWIFT—WHITE-BELLIED SWALLOW—THE YELLOW-BIRD—BARKING CROW—NORTH-WESTERN FISH CROW—HUDSON'S BAY MAGPIE—STELLER'S JAY—COUNTRY EAST OF THE CASCADES—THE OSOYOOS LAKES—NEW MUSK-RAT—FIBER OSOYOOSSENSIS (LORD)—NEW SPONGILLA, SPONGILLA LORDII (BOWERBANK).

FOLLOWING the course of the 49th parallel from the Gulf of Georgia, to our astronomical station at Ashtnolow,* near the Silmilkameen Valley, is an unbroken forest with a thick and tangled growth of underbrush, in which there is little or no grass, or food of any kind for pack-animals; a deficiency we were compelled to supply by providing grain. Here and there so-called 'wet prairies' are met with, even at an altitude of 2,000 feet above the sea-level; but these marshy oases yield only the scantiest forage, being covered

* Previously alluded to, Vol. I.

with *Equisitaceæ*, and rank sour sedge-grass. The characteristic trees attaining to any magnitude on the western slope of the Cascades are the Douglas Spruce (*Abies Douglassii*),* Menzies Spruce (*A. Menziesii*), Hemlock Spruce (*A. Mertensiana*), *Pinus contorta*, and the useful so-called 'Cedar' (*Thuja gigantea*). Between the open bits of prairie are graceful groups of the large-leaved Maple (*Acer macrophyllum*), Vine Maple (*A. circinatum*), together with the waving Dogwood (*Cornus nuttallii*), and brilliant red and green Alders (*Alnus rubra* and *A. viridis*); whilst the river-banks and loamy valleys are shaded by clumps and rows of massive poplars (*Populus balsamifera*), under the larger forest-growths, Mahonia, Spireus, Ribes, Vacciniums, Gaultheria, and that most prickly and unpleasant plant named the 'Devil's Walking-stick' (*Panax horridus*), mingle their leaves and branches into an impenetrable tangle.

The first twenty miles of the Boundary-line takes nearly a parallel course with the Fraser

* Through patches of these gigantic firs, near the Sumass prairie, the axe-men had to cut the Boundary-line. The trees grew thickly together, and many exceeded 30 feet in circumference, and measured from 200 to 250 feet when stretched on the ground by the brawny choppers.

river, at an average distance from it of nine miles. This part of it is quite or very nearly a dead level, and very little above the sea, densely timbered, and terminating at the spurs of the Cascade Mountains. Here the Sumass prairie and its lake, so often referred to, are situated. The lake is ten miles long, and about four-and-a-half wide. I have already explained how the prairie is flooded, and that in June the water again subsides; after this the growth of the various grasses and sedges (*Cyperaceæ*) is rapid beyond anything I have ever witnessed elsewhere. In two months the grass attains a height of four and seven feet. As the water disappears, swarms of insects accumulate, as if by magic; birds of various species arrive to devour them, build their nests, and rear their young.

Amongst the earliest of these visitors I noticed the Northern Swift (*Nephocaetes Niger*, Baird). It was a foggy day early in June, and, the insects being low, the birds were hovering close to the ground. I shot four. The next day I searched in vain, but never saw the birds again until the fall of the year, when they a second time made their appearance in large numbers—birds of the year as well as old ones. From their habit of flying at a great height, it is extremely difficult to obtain

specimens. I believe I again saw this swift at Fort Colville.

In June I observed a very large number of swifts in company with about an equal number of goatsuckers (*Chordeiles popetue*); they were hovering at a great altitude. After waiting a very long time, I succeeded in obtaining one goatsucker. The swifts never came within shot; neither did I ever after see them. On opening the goatsucker, its stomach was perfectly gorged with winged ants. I have no doubt this was the attraction which delayed the swifts on their northern route; and from the fact of their disappearing here, as they did at Sumass, I imagine they go far north to nest; had they bred anywhere along the Boundary-line, I am sure I must have discovered them.

White-bellied Swallows (*Hirundo bicolor*) are always in great force, and make their nests of ducks' feathers, in holes either bored by themselves, or the work of woodpeckers, in the tottering old willows that grow round the oozy margin of the lake. Flycatchers, sedgebirds, and a host of other summer migrants, specified in the Appendix, take up their respective hunting-grounds, and commence domestic duties.

One of the most conspicuous of the smaller

finches is the Yellow-bird (*Chrysomitris tristis*, Bon). This tiny finch—robed in golden-yellow, delicately shaded and streaked with rich brown, a velvet black cap on its head, and just enough white as a fringe to light up the dark tail and wing-feathers—may be ranked as the most exquisitely-plumaged of North-western birds. One could almost imagine, as it silently climbs amidst the green foliage of the pines, that it was an orchid-blossom blown from the tropics into colder regions, rather than a bird.

As a singer the 'yellow-bird' has little to boast of—as an architect it is deserving the highest credit. The nest is a perfect work of art, most delicately woven, in shape symmetrically round, and skilfully lashed with real ropes of fibre to the forked branches chosen as the building-site.

Fine linty materials gathered from different plants, thistledown, spiders' webs, and silk pilaged from insect cocoons, make up the walls; the inside, lined with feathers, hair, and soft fibres, is a bed fit for a fairy-queen to sleep in. Five eggs are usually laid in June or early in July, soon after the birds make their appearance. They are distributed plentifully throughout British Columbia, and are sometimes seen on Vancouver Island, but were more abundant east than west of the Cascades.

As a contrast to this and other gay-looking birds, hosts of crows take up building-lots in the thick thorn-bushes and lofty pine-trees. The latter position is chosen by the Barking Crow (*Corvus americanus*).

If birds are gifted with ventriloquial powers, I should say the Barking Crow was at the top of the profession. Wandering through the forest encircling the prairie, one's ears are dinned by the extraordinary sounds made by these crows. Sometimes it seems as if these hidden polyphonists were making all sorts of disagreeable fun of you, and chuckling hoarsely at their own jokes; then one goes in for a 'bit of a song,' and others readily taking it up, they manage between them to raise, as a refrain, a combination of discords compared to which the parrots' screams in the Zoological Gardens is whispered melody. They shriek, laugh, yell, shout, whistle, scream, and bark—driving one to wish all the crows in British Columbia were consigned to the depths of Hades. If listening eagerly for the note of a bird you are most wishful to discover, a Barking Crow is pretty sure to perch close over your head and begin its unearthly noises; or if enjoying the notes of a forest minstrel, its songs perhaps quite new to the ear, in comes a crow with its husky gurgling

chorus, and spoils the melody. If reposing on the soft warm sandy beach in dreamy reveries, listening to the lip-lap of the ripple, and thoroughly enjoying the quietude of surrounding nature, a flock of roystering crows are sure to alight on the rocks close by, and do their best to display their vocal capabilities. It surely must have been one of the British-Columbian crows that quaint old Æsop knew! 

They also go farther inland to breed, building their nests of sticks in low bushes, often not four feet from the ground, where there are no tall trees. I saw one little stream, east of the Cascades, where the low alder-bushes growing along its banks were quite as thickly filled with the nests of the Barking Crow as the trees in an English rookery are with rooks' nests. I could look into some of them, and into all readily put my hand without climbing; the sticks are neatly crossed and piled together, and the interior lined with grass stalks, hair, bits of lichen, and dry leaves; the nests are open at the top, and five was the greatest number of eggs I saw in a nest. The Barking Crow is found in every part of British Columbia or Vancouver Island, and the lesser islands in the Gulf of Georgia; simply changing their quarters from



the forests to the seacoasts during the winter months, when they live entirely on molluscs, crustaceans, dead fish, or anything else procurable from Neptune's realms.

A near relative arrives at the same time, and takes up its quarters in the thick scrubby white thorns—the North-western Fish Crow (*Corvus caurinus*, Baird). This much smaller crow Dr. Baird has described in his valuable book on North American Birds (page 569). But he says, in finishing his specific descriptions, 'Indeed, it is almost a question whether it is more than a dwarfed race of the other species.'

I have not the slightest doubt that it is a distinct species, although so very like the Barking Crow in all its essential features, as far as colour, form of bill, scaling of tarsi, and other details are concerned. The much smaller size, difference in voice, and habit of constructing a domed nest lined with mud, are constant characters of sufficient value to justify Dr. Baird's specific difference. These small crows are principally found on the seacoast, retiring to the trees to sleep and caw during high-tide; following out its ebb, and receding before its flood, they feast on any marine provender they may be lucky enough to find. They never make such a

discordant babel of sounds as their friends and companions the barkers, but *caw* much as do our jackdaws.

The seacoast is abandoned when the breeding-time arrives, early in May, when they resort in pairs to the interior; selecting a patch of open prairie, where there are streams and lakes, and the wild crab-apple and white-thorn grows, in which they build nests precisely like that of the magpie, arched over the top with sticks. The bird enters by a hole on one side, but leaves by an exit-hole on the opposite. The inside is plastered with mud; a few grass-stalks strewn loosely on the bottom keep the eggs from rolling. This is so marked a difference to the Barking Crow's nesting, as in itself to be a specific distinction. The eggs are lighter in the blotching, and much smaller. I examined great numbers of nests at this prairie, and on the Columbia, but invariably found the same habit of doming prevailed. After nesting, they return with the young to the sea-coasts, and remain in large flocks, often associated with the Barking Crows, until nesting-time comes again. During their sojourn inland, their food consists principally of small reptiles, freshwater molluscs, or grubs; and I have seen them catch butterflies flying near their nests,

which are placed low down, but in the centre of a very thick prickly bush—a stronghold rigidly guarded against all-comers. Not even a small bird dare perch on that sacred bush; and if hawk or weasel venture to poach for eggs or young birds, husband and wife dash fearlessly at the thief, and ring such changes on its head or body with their powerful beaks, that victory generally lies on the side of the crows. Seven is the greatest number of eggs I ever found in a nest, five and six being the average. I saw it north at the extreme end of Vancouver Island, but do not imagine that to be its limit. Its southern range (I only speak from personal observation) was Cape Flattery; whether it extends along the coasts of Oregon and south of California, I do not know.

Very often magpies (*Pica Hudsonica*) build in the bushes, as close as safety permits them to venture near the belligerent Fish Crows. These thievish murderers are everywhere, from Vancouver Island to the Rocky Mountains. They so very nearly resemble our British bird, that one would know no difference save by a careful comparison; seeing them in freedom, they appear to be identical. I call them murderers, because I have seen them kill mules: and worse than that, pick the

eyes out of a living animal when, wounded and helpless, it lay down to die; and pounce on maimed birds, break in their skulls, and deliberately devour their brains whilst the muscles still quivered with life.

To the packer the magpies are dire enemies. If a pack-mule or horse has a gall, and happens to be turned out to graze with the wound uncovered, down come the magpies on its back; clinging with their sharp claws, reckless of every effort to displace them, they peck away at the wound; the tortured beast rolls madly, and for a short time the scoundrels are obliged to let go, but only to swoop down again the instant a chance offers. This repeated agony soon kills an animal, unless the packers rescue it.

We had frightful trouble with magpies at our winter mule-camp, near Colville. They gradually accumulated, to eat the offal and what there was besides, until they were in hundreds, and became perfectly unbearable. Shooting at them was only wasting valuable ammunition. The packers were driven almost into a state of revolt. We had an old maimed suffering mule which was to be killed, so the packers gave it a ball containing a large dose of strychnine: death was immediate, and the carcase, ere ten minutes had

elapsed, was covered with magpies working at the eyes, lips, sores, and soft skin inside the thighs. It was the most singular spectacle I ever witnessed. One after the other the birds rolled from off the dead mule, and as they fell and died, others greedily took their vacant places; and so this terrible slaughter went on, until the heaps of dead magpies nearly buried the body of the mule. Two foxes, one cayote, several Indian dogs, and a large wolf, on the day following the mule's demise, lay dead by the side of the poisoned birds. It was a terrible revenge—how far justifiable is a matter of opinion. The packers, of course, were in wild glee at the entire success of the scheme.

The magpie builds much the same kind of nest as our British species, lays seven or eight eggs, and commences nesting in March, long before the snow begins to thaw. Numbers winter in the interior, whilst others resort to the seacoast, and feed on marine provender. They grow so tame and impudent in winter, that I have often given them food from my hand, without their showing any evidence of fear.

Steller's Jay (*Cyanura stelleri*) makes its presence known by the continual utterance of a discordant scream; hopping perpetually from bough

to bough, then darting down to nip an insect, performing short erratic flights, and jerking its crest of bright feathers up and down, its noisy song seems everywhere. The Blue Jay appears the embodiment of restlessness, and by sheer impudence attracts attention from even the lone hunter. Fond of frequenting the haunts of man, jays are always plentiful near Indian lodges or white men's shanties. By no means epicurean in tastes, they readily devour anything—seeds, salmon, grasshoppers, or venison. The nest, artfully concealed amidst the thick foliage of a young pine-tree, is composed of moss, small twigs, lichen, and fir-fronds, and lined with deer-hair. Seven is about the average number of eggs laid.

On reaching the eastern slope of the Cascades, grass becomes abundant, and dry fodder is unnecessary. Trending eastward to cross the Similkameen Valley, and thence passing the Osoyoos lakes, grass is all the way abundant, and the vegetation evidences a very much drier climate; instead of dense impenetrable forest, the trees are sparsely scattered. Leguminous plants, valerian and others, give a marked character to the general herbage. On reaching the Na-hoil-a-pit-ka river, which bends in a southerly course

to join the Columbia, a short distance above the Kettle Falls, mountains again commence; and from this point to the summit of the Rocky Mountains, the Boundary Line crosses a succession of mountain ranges, with narrow valleys (often only rocky ravines) between them. The illustration, taken from a photograph of one of our camps amidst this chaos of rocks and trees, shows how arduous the task of marking and cutting the line through it really was.

I must linger a short time at the Osoyoos lakes. This magnificent piece of water may be defined as one large lake, or three smaller ones, with equal correctness; as a narrowing-in, at particular points, gives the appearance of an actual division into separate lakes. The Boundary Line runs through its centre, so that one half the lake belongs to England (its northern half), the southern to the United States. The shore is sandy, like a seabeach, and, strewn thickly with freshwater shells along the ripple line, has quite a tidal aspect. On either side, a sandy treeless waste stretches away to the base of the hills, and so carpeted with cacti—which grow in small knobs, covered with spines, like vegetable porcupines—that walking on it, without being shod with the very thickest boots, is to endure

indescribable torture; the prickles are so sharp and hard, that they slip through ordinary leather like cobblers' awls. We had to tie up our dogs and horses, for the latter, getting the prickly knobs into their heels, kicked and plunged viciously until exhausted. The dogs got them fast to their feet, and, impatiently seizing the vegetable pests, only aggravated the mischief by transferring them to the tongue and cheeks. I have no hesitation in saying, a dog must inevitably die from starvation if he ventured to cross this waste alone; the cacti once in his mouth, unaided he could never free himself. A low 'divide' separates this valley from the Similkameen, the water from the lakes eventually finding its way into the Columbia river. If there is an Eden for water-birds, the Osoyoos lakes must surely be that favoured spot. At the upper end, a perfect forest of tall rushes, six feet in height, afford the ducks, grebes, bitterns, and a variety of waders, admirable breeding haunts—safe alike from the prying eyes of birds that prey on their kindred, and savages that indiscriminately eat anything.

The water, alive with fish at all times, is in the summer crowded with salmon. In the pools on one side of the lake, I obtained a new

species of musk-rat, which I have named *Fiber osoyoosensis*.

The Musk Rat, which I believe is the well-known *Fiber zibethicus* of Cuvier, makes its holes in the clayey banks of streams and pools where the water runs slowly. The entrance is always below the surface, the hole dug up in a slanting direction above the water-level. A stage or flat place is cleared, which constitutes the dining-, drawing-, and bed-room; leading to the entrance of this mansion are a number of open cuttings, running in all directions, dug in the mud at the bottom of the water. When foraging about, as the musk rat usually does about twilight, if alarmed, it dives at once into one of these cuttings, and, rushing rapidly through, stirs up the mud, thus fouling the water, and completely and effectually concealing itself.

The other Musk Rat, which I call *Fiber osoyoosensis*, differs in size, colour, and structure, but particularly in habits, from the preceding. This fellow chooses as his haunt a clear pond or lake, and in water from three to four feet deep constructs a house of bulrushes, in form conical, built up from the bottom—how I am at a loss to imagine—the roof cleverly arched over into a domed shape, and raised about a foot above the

water. Up in this dome, skilfully constructed, is his suite of apartments, the entrance to which is far below the surface of the water. His habits very nearly approximate those of the beaver: he swims about boldly in the daytime, but dives rapidly on the approach of danger. If a dead or badly-wounded duck be left on the pool, it is at once seized on, towed into the house, and devoured.

I am quite satisfied, from careful observation, that the Musk Rat is a carnivorous beast whenever he has a chance; and the straight, sharp-cutting, strong incisor-teeth are well adapted for the indulgence of cannibal propensities.

If there were no rushes growing where this mud-rover lived, it might be assumed that he dug a hole into the bank from lack of material to build a house; but I have often seen the rushes growing abundantly where he has chosen his mud hut, offering every facility for architectural pursuits, had he so willed. On the other hand, had the rush-builder been precluded from finding a mud-bank in which to construct his mansion, it might have been supposed that he had resorted to making a hut with rushes on that account.

FIBER¹OSOYOOSENSIS. (LORD, *sp. nov.*)

Sp. char.—In total length $3\frac{1}{4}$ inches shorter than *Fiber zibethicus* (Cuv.); in general size much smaller. General hue of back jet-black; but, the hair being of two kinds, if viewed from tail to head it looks grey—the under fur being fine, silky, and light-grey in colour; concealing this on the upper surface are long coarse black hairs; the belly and sides somewhat lighter; head broad and depressed; neck indistinct; ear small, upper margin rounded; eye small and black; the feet, legs, and claws are so exactly like those of *Fiber zibethicus* that it would be useless to describe them again; whiskers long, and composed of about an equal number of white and black hairs; incisors nearly straight, on the external surface orange-yellow.

The skull differs from *Fiber zibethicus* in being much smaller, $2\frac{1}{8}$ inches in length, $1\frac{1}{8}$ inch in width, very much shorter from the anterior molar to incisors; nasal bones much more rounded at their posterior ends, the superior outline less curved; postorbital process not nearly so much developed; the cranial portion of the skull in its upper outline is much less concave, and smoother; superior outline of occipital bone not so prominent or strong; incisors shorter and much straighter; molars much smaller, but in general outline similar.

In this lake I obtained a new species of fresh-water mollusc, which Dr. Baird, who kindly described it for me, named *Succinea Hawkinsii*, in honour of the Commissioner, Colonel Hawkins. It will be found carefully described in the Appendix.

I also observed a spongilla growing round the stalks of the rushes, much larger, and more sponge-like in character, than any spongilla I had previously seen. There was no lack of it in many places; the rush-stalks were all covered with it,

from their root-hold to the water-level, a length of two feet, and often more. This spongilla Professor Bowerbank has kindly described for me since my return. I cannot do better than append the Professor's description:—

‘SPONGILLA LORDII. (BOWERBANK, N. S.)

Sponge sessile; coating surface even, smooth; oscula simple, dispersed. Pores inconspicuous; dermal membrane pellucid, aspiculous; skeleton specula, acerate. Ovaries congregated on the basal membrane, very numerous; specula entirely spined, fusiform, cylindrical, dispersed on the surface. Basal membrane abundantly spiculous; specula dispersed same as those of the ovaries. Colour ochreous, yellow to green. Examined in the dried state.

‘The sponge embraces the stems of a large species of reed for eight or ten inches of its length, and is about six or nine lines in greatest thickness. In its general habit, and the structure of its skeleton, it closely resembles our British *Fluviatilis*; but it differs from that species in the mode of disposition and structural peculiarities of the ovaries, which more closely resemble those of our British species *S. lacustris*, but from which it differs in having the specula of the ovaries nearly straight, while those of the last-named species are usually arcuate. The dermal membrane of *S. lacustris* also abounds in entirely-spined tension specula, while that of *S. Lordii* is aspiculous.

'This species is interesting, from its close alliance in structure to the European type of this genus, and from the very slight structural resemblance it has to the numerous species of the Amazon river; the principal character by which it is connected with the latter series of species being the mode of the congregation and disposition on its basal membrane of its very numerous ovaries.'

'I have dedicated this species to Mr. J. K. Lord, as a slight acknowledgment of the good services he has done to science by the collection of this and numerous other valuable specimens of Natural History, from the unfrequented regions which he has explored.'

CHAPTER V.

REJOIN THE COMMISSION—JOURNEY TO WALLA-WALLA AND BACK
—SCENERY OF THE UPPER COLUMBIA—OLD FORT WALLA-WALLA
—WALLA-WALLA INDIANS—NEW WALLA-WALLA CITY—THE
HORSE-FAIR—INDIAN MUSTANGS—CURIOUS CUSTOM OF THE
SIS-KY-OU INDIANS—THE AMERICAN GARRISON—AN UGLY
ADVENTURE—OVERLAND TRIP TO WALLA-WALLA—CEDAR
SPRING AND THE SHORE-LARKS—SAGE COCK, OR COCK OF
THE PLAINS—TOWNSEND'S GROUND-SQUIRREL—A DIFFICULT
MARCH—THE PRAIRIE HARE—CASTLE AND CHIMNEY ROCKS—
REACH WALLA-WALLA.

WE have rejoined the Commission at the Dalles; one party has proceeded up the west or right bank of the Columbia, there to strike off in a northerly direction for Fort Simcoe, in order to reach the point at which the Boundary Line had been abandoned the previous year; it being more expedient to ascend the Columbia, in order to get east of the Cascades, than it was to transport so large a party, with mules, across their serried heights

We are to keep on the left bank of the Columbia, proceeding first to Walla-walla; thence,

taking a northerly direction, to cross the Snake river, where its tributary, the Peloose, joins it; then, passing by the Big Lake, travel due north to Fort Colville. It will facilitate description to resume my journal:—

June 5.—I start alone for Walla-walla. A stage from the Dalles takes me to the Des Chutes or 'fall' river, where I embark in the 'Colonel Wright,' a small crank steamer propelled by an enormous stern-wheel. The Columbia river was in full flood, and rushing down with terrific force made our progress tediously slow. We were well out in the current, when there was a hue-and-cry that the wood-pile was on fire; luckily it did no harm—the burning logs were dragged out and thrown into the water. More dismal scenery can hardly be imagined—not a tree or shrub visible—nothing but grass dry as hay, and level sandy plains. At Sundown the vessel is made fast to some stakes driven into the bank, there being nothing else to moor her to.

June 6.—The splash of the stern-wheel and creak of machinery awake me; we are again struggling against a terrific current, and the wind blowing a gale dead ahead. The same monotonous shrubless waste—nothing to interest or amuse, save the excitement of twisting and

struggling through rapids, and watching the 'deck hands' take in wood at the different 'wooding stations.' The boilers are heated with wood only, which is hauled by ox-teams from the nearest forest or timbered district, often many miles: cutting, cording, and hauling the wood requisite for the trip from the Des Chutes to Walla-walla is a very heavy item.

We pass the mouth of John Day's river, the Umatilla, and several other tributaries. Where the rivers joined, small encampments of Indians were busy fishing, but we did not go sufficiently near to see what fish they were taking. As we get farther up-stream, colossal piles of basaltic rocks, naked and cinderous, appear to have grown from out the sand; quaint are the shapes these masses assume, and from resemblances really startling are named Chimney-rocks, Castle-rocks, Turret-rocks, and so on, as they suggest some well-known object to the traveller. The weariest day must have an ending; at night we tie up as before, only twelve miles below old Fort Walla-walla—our destination.

June 7.—We are at old Walla-walla, 5.30 A.M.; wind blowing a hurricane, and carrying along with it sand, and even small pebbles. The landing is effected on a kind of floating pier; and

whilst the stage-driver is harnessing his mustangs, I take a peep at the old fort, or rather what remains of it, which is a square enclosed by adobe (mud) walls loopholed, and once guarded by massive gates; but these are gone, as are the houses of the fur-traders that the crumbling old walls protected in the early days of the Hudson's Bay Company.

The Walla-walla Indians, at the time the Hudson's Bay Company established this most desolate trading-post, were a wild and powerful tribe, very hostile and averse to the Company's trading. After several severe fights, in which many lives were lost on both sides, the traders abandoned the fort during the Sis-ky-ou war, in the year 1836. Whisky, disease, and forays with white men and neighbouring Indian tribes has so reduced the once-dreaded Walla-wallas, that a few broken-spirited lazy horse-thieves are their only representatives to be met with. The Walla-walla river joins the Columbia close to the steamer-landing.

I endure the usual amount of stage discomfort, in passing over thirty miles of the most miserable forlorn-looking country I ever beheld. We reach New Walla-walla city about dusk; the city is one straight street about a quarter of a

mile in length, consisting principally of grog-shops (or groceries), tawdry bar-rooms, billiard-saloons, a few stores, and 'Corals' for putting horses in. The throng in the streets consists of half-naked savages, with their squaws and children, gold-miners, settlers, American soldiers, and rowdies of all sorts. I learn there are two causes to which this extraordinary city owes its existence: first, the establishment of an American garrison, to protect the settlers in Washington Territory from Indian incursions, which garrison is about a mile away; and secondly, the rumours of rich gold-placers in the Blue Mountains, a little to the southward.

I met my friend, to whom I had letters of introduction, and slept at his house, about a mile from this den of villany.

June 8. — The news that I was a Government Agent, seeking mules and horses, spread like a prairie-fire; and Walla-walla, as I enter it this morning, is a perfect horse-fair. Sis-ky-ous, Walla-wallas, Nez-perces, and Indians from various smaller tribes, living on the Columbia and its tributaries, were dashing wildly up and down the street—some on bare-backed horses, others having a rude kind of saddle: all are yelling, whooping, and flourishing their lassos,

like maddened fiends. Hoping to attract my attention, they ride much closer than seems quite consistent with my personal safety. So I ensconce myself in a 'Coral,' and contemplate the fair over the strong railings quite as agreeably and very much more safely than outside.

Half-naked savages, one after another (often two or three together), dash up to the rails, and fling themselves from off the panting horses; run their hands down the length of the horse's back, to show it has no galls or sores; tickle its flanks and creep under its belly, to demonstrate its docility; drag open the lips, to show the teeth; invariably ask four times the sum they intend to take; give a frantic yell on being offered less; spring again upon the horses' backs, to gallop furiously about, until, tired of further exhibition, and hopeless of exacting a larger sum, they ride quietly to the 'Coral,' turn in the horses, and receive payment. The detail of all my bargainings would afford the reader but little interest; suffice it to say, I made many purchases, and afterwards adjourned to the American garrison.

It is difficult to say when horses were introduced into the Indian country west of the Rocky Mountains, but most probably about the commencement of this century. They are clearly

descended from Spanish stock—stout, compact, enduring animals, seldom exceeding 15 hands, 14½ hands being about the average standard of height. Spotted horses are very common, and much prized by the squaws.

The Sis-ky-ou Indians have a singular custom of cutting off the tails of the horses to a mere stump, and cropping the ears, as terrier-dogs are trimmed by the 'Fancy.' For what purpose such barbarous treatment is resorted to I could not discover, but I imagine it enables them more readily to identify their horses in case of theft. I purchased a crop-eared tailless horse, for my own use, but the poor animal suffered so fearfully from the punctures of musquitos and sand-flies, having no tail to whip them off, that I could not ride him in fly-time.

I am most hospitably treated by Colonel Wright, the commandant of the American garrison, which consists of a number of very neatly-built houses, arranged in a square. Four companies, consisting of infantry and cavalry, are sometimes stationed here. The officers have a capital billiard-room, and a small theatre for amateur performances. The situation is desolate in the extreme—nothing visible in any direction but a wide sandy extent of barren treeless country,

save a dim dark line bounding the horizon to the right, which I am told are mountains, from which all the wood used in the garrison is dragged by mules and ox-teams. I spend a delightful evening, and sleep at Captain Dent's.

June 9.—I am again *en route* for old Walla-walla, to catch the steamer. The stage has no other passenger. I can see by the black masses of cloud, rolling like huge waves one after another, that a storm of no trifling nature is about to break over us. It rapidly darkens, and the first flash of lightning hisses through the stage, followed instantly by a deafening peal of thunder; the wind, as if suddenly let loose, rushes across the waste, carrying with it sand enough to bury one; flash follows flash so rapidly, that the dismal plain seems permanently lighted; the crashing thunder-claps completely overpower all other sounds, and the rain begins to pour down in a very deluge.

The storm does not last long; but the driver, blinded by the sand, and the glare of the lightning, has missed his way, and we are clearly in the Walla-walla river. The stage fills rapidly. I dash open the door, determined, at least, to have a swim for my life; there is a terrible scrambling of the horses, accompanied with a

heavy lurch, a cheery 'All right, Cap.!' from the driver, which tells me we are again on terra firma. We hold a council, and determine to unharness the mustangs, and await the daylight. It certainly was the most miserable night I ever passed; wet, cold, and hungry, my miseries were enhanced by the fear of missing the steamer, and being detained perhaps a month.

June 10.—It was fortunate we did not attempt to proceed; we are far away from the road; and, as I suspected, had made a short voyage in the Walla-walla river. Luckily, the banks being low and shelving, the horses were enabled to scramble out, and tug the stage after them. We saved the steamer by the merest chance, and I am again on board. Going down the river is a very different affair to coming up. We go at such a rate, that the wheel at the stern is next to useless; through some of the swifter rapids it is quite like flying; if a rock should be touched, we shall be food for the fishes. What occupied us three days to accomplish up-stream, we do in six hours down. I reached my camp at the Dalles about seven o'clock in the evening.

Three days were occupied in making the necessary arrangements for departure.

June 14.—We start again for Walla-walla, this

time by land. The Commissioner, nineteen men, and thirty-two laden mules, complete our party; the others, with some heavy baggage, are gone by the steamer, to await our arrival. We cross the Fall-River on a very creditable wooden bridge, for which the modest sum of half a dollar, (two shillings) was demanded for each animal, packed or ridden. (This bridge, soon after, was completely swept away by a heavy flood.) Thirty-four bullocks, driven by two mounted herders, formed a kind of rearguard.

We made a twenty-mile march, and camped at Mud Creek—a dismal place, with little or no wood, and very bad water.

When tents are used, getting away in the morning is always a tedious process; we start about seven o'clock. For some distance we wind through a series of rounded hills, covered thickly with 'bunch-grass,' a most nutritious herbage; the grass grows in tufts—hence the name. Not a shrub to be seen—neither bird nor beast. Descend a basaltic gorge, like an immense canal cut in the solid rock, and come suddenly on a swift stream, named John Day's river; this we ferried in a kind of scow, hauled from side to side by a rope. Again we had to pay two shillings a head for mules and horses; the bullocks swam it.

June 15⁴.—Made a short march, and camped early, near some stunted juniper-trees, where a small stream of water literally squirted out from the side of a steep bank; it is the only water within a long distance, and the place bears the name of Cedar Springs, as the junipers are called cedars by the traders.

It was most interesting to watch the Shore Larks (*Eremophila cornuta*). As evening approached, they actually came boldly in amongst the men and mules, intense thirst overcoming all sense of fear. These handsome little birds are very plentiful throughout British Columbia. They nest very early on these sandy plains, even before the snow leaves the ground. I saw young birds early in May. Near this spring I saw the Cock of the Plains, or Sage Cock (*Centrocercus urophasianus*).

I scarcely think this handsome grouse can be strictly included amongst British-Columbian birds, although its northern range is very near the Boundary Line on the right bank of the Columbia river; still, I only know of its existence west of the Rocky Mountains, in Washington and Oregon Territories. I met with it before, on the sandy plains near the head-waters of the Des Chutes river, and know of its being found

on the right and left banks of the Columbia, to the Spokane river on the one side, and the Yakima on the other.

These grouse live entirely on the open sandy plains, their principal food being the wild-sage (*Artemisia*), which imparts such a rank unpleasant flavour to the flesh, that one might almost as well chew the bitter bush as eat any part of a sage-cock. It is almost impossible to obtain the cocks in full nuptial costume, when their necks are fringed with the most delicate pinnated feathers. The meeting of two cocks is sure to result in a fight, during which the greater part of these ornamental feathers are usually torn out. Unless the birds are killed prior to a hostile encounter their plumage is never perfect, as they only have these fine neck and back-plumes at mating-time.

It is impossible for anyone to avoid being at once impressed with the extraordinary adaptation of the sage-cock's colour to the localities in which it lives; the mottlings of brown, black, yellow, and white, are so exactly like the lichens covering the rocks, the stalks of the wild-sage, and the dried leaves, bunch-grass, and dead twigs scattered over the sandy wastes, that it is impossible to make them out to be

birds when they clush close to the ground. Their greatest enemies are eagles and large falcons, which, ever soaring over the plains, or, perching on some lofty rock-pinnacle, scan the far distance for any moving objects on which to pounce. The poor sage-cocks have no shelter, not a tree or shrub, save the pungent sand-plant, is there to hide them; but their marvellous coloration compensates for lack of other protection, deceiving even the sharp-eyed birds of prey. They nest early in May; the eggs are laid on the bare ground, at the foot of a sage-bush, or under a shelving rock. They remain on the plains during the winter, becoming at that time nearly white, as do the ptarmigans.

The only animal I saw was a small rodent, or ground-squirrel (*Spermophilus Townsendii*). This small but handsome little animal is found in great numbers on all these arid plains. The Spokane river appears to be the limit to its range towards the Rocky Mountains. Its food must mainly consist of the wild-sage and grass, as nothing else grows here. What its northern range may be I do not know, but south I have seen it in Oregon down to the Shasta plains. How it obtains water I am at a loss to imagine, for I have seen it often on these dry sandy plains,

where thirsty nature had not even dew to drink, and miles away from water. They dig small holes in the sand, at the mouth of which they sit on their haunches, like a begging-dog. On the least alarm, one gives a shrill sharp whistle, when all take headers into their burrows. In winter they hybernate, coming out about the middle of April.

June 16.—We camped near a rough kind of farm, on a small stream called Cow creek.

June 17.—Still the same sandy treeless district. To-day the sun really scalds us. A fresh breeze blows in our faces, but only adds to the general discomfort—by filling every pocket with fine dust, inflaming the eyelids, and making one's mouth feel as if a piece of grinding-stone had been chewed for luncheon. My poor dogs suffer dreadfully; fourteen miles from water to water, over hot sand, completely exhausts them. They make known their griefs by whining piteously, laying down, and imploring me to give them water. I know what my poor dumb friends mean as well as if they proclaimed their wants in words, and cheer them on by giving them a little water from my canteen, converting my soft felt hat into a drinking-basin.

As we ride on, I notice what I at first imagined

must be the droppings of a large flock of sheep covering the ground thickly, just as though the animals had been folded. I had barely time to think what animal could be so abundant, when the dogs, tired as they were, started two or three large hares from under the wild-sage bushes. We saw numbers of them, and shot several; but the flesh tasted so strongly of the wild-sage, on which these hares mainly subsist, that eating it was an impossibility. The Prairie Hare (*Lepus campestris*) appears entirely confined to these sandy desert-lands, being replaced by the Red Hare (*L. Washingtonii*) in the timbered districts.

The fur of the Prairie Hare is long and silky, and exactly the colour of the sand and dead leaves under the bushes where they make their 'forms;' unless they move, it is impossible to distinguish them, although looking down on their backs. The ears are quite a fifth longer than the head. In summer, the colour of the back, sides, throat, and limbs is grey, varied with yellow and brown markings; tail quite white, above and below; ears yellow on the outside, but tipped with black, thinly covered inside with long white hairs; belly quite white. In winter the hairs change to a pure white; the colouring matter is absorbed, and

the animal adapted to the snowy garb of winter, without the trouble of changing its coat.

We ascend a short hill, and from its summit gaze on the long-desired water; but, misery of miseries! in the pool (only a very small one) are six Indian horses, pawing and splashing, whilst their riders, squatting close by, are indulging in a friendly pipe. This, in itself, was enough to aggravate any thirst-famished man, but, worse than all, our dogs, the instant they caught sight of the water, rushed off, in defiance of shouts and threats, and helter-skelter dashed into the pond. Not content to stand and lap, like well-conducted dogs, they rolled in the water, and so frightened the horses, that together they managed so to stir up the bottom, that drinking was impossible, unless liquid mud were swallowed. There is nothing to be done but to dip some water into a pail, and wait for the thickest of it to settle.

This is certainly the most dismal camping-place I ever beheld. The Indians at the pool are Umatillas, and live near the junction of the Umatilla and Columbia rivers—a small peaceful tribe, living principally on fish, sage-cocks, and prairie-hares.

My journal records nothing of interest until

June 21.—We pass the masses of rock I had

previously seen from the deck of the steamer, Castle Rock and Chimney Rock—black columnar pyramids, which appear to have dropped down upon the sandy plains, rather than to have been upheaved from below—bare and naked, without even a coloured lichen to break their sombre cinderous uniformity. These basaltic mountains serve but to intensify the desolation of this interminable wilderness. Our course is now along the bank of the Columbia, that rushes on, muddy and turbulent, to reach the Walla-walla, which we follow up for about two miles, to meet our party, that had been sent by steamer; find them comfortably encamped, and enjoy a few days' rest, after our sandy, frying, dismal trip.

CHAPTER VI.

THE GREAT PLAIN OF THE COLUMBIA—POND TURTLES AND THEIR NESTS—THE SAGE RABBIT—FIND CURIOUS STONEIMPLEMENTS—A TRADE IN FLINTS AND MARINE PRODUCTIONS AT SOME REMOTE PERIOD, AND A SKULL (VIDE ILLUSTRATION) UNALTERED BY PRESSURE—LEAVE WALLA-WALLA—CROSS THE SNAKE RIVER—PELOUSE INDIANS AND THEIR HORSES—FALLS OF THE LOWER PELOUSE—A DISAGREEABLE INTRUDER—PLEASANT TO SEE TREES AGAIN—SAND-FLIES—BREEZE-FLIES—CLARK'S CROW—THE SPOKAN RIVER—WALKER'S PRAIRIE—PARRY'S GROUND-SQUIRREL—THE WAY THE THREE SPECIES OF GROUND-SQUIRRELS REPLACE EACH OTHER ON THE PLAIN—PARKMAN'S WREN AND ITS NEST—NUTHATCHES—THE TITS—DEAD MAN'S PRAIRIE—ARRIVE AT FORT COLVILLE.

THE great plain of the Columbia over which we are travelling, though its name gives the impression of a uniformly level surface, has, nevertheless, its mountains and valleys. Its northern boundary is an irregular line between the parallels of 48° and 49° ; southward it merges into and is continuous with the central plains of Oregon, and thence extends to Salt Lake City, in Utah Territory.

The vegetation indicates a much drier climate than that of the western side of the Cascades.

Dr. Lyall says,* in reference to this plain: 'A good many plants found in this region are strictly local in their distribution. Excepting by the banks of lakes or streams, there are no trees; and some of the orders, such as *Ranunculaceæ*, *Caryophyllaceæ*, *Portulacaceæ*, *Rosaceæ*, *Crassulaceæ*, *Saxifragaceæ*, *Vacciniaceæ*, *Orchidaceæ*, *Liliaceæ*, &c., which species are so plentiful in the first region, have comparatively few representatives; whilst others, such as *Leguminosæ*, *Onagraceæ*, *Polemoniaceæ*, &c., are more common in this district, and give a character to the vegetation.'

Difference of elevation in the plain regions have each their peculiarities. The spurs of the Cascades are usually too dry for even good grazing-ground—their summits rocky, barren, and sparsely timbered. A strip of land immediately adjoining the Columbia, where it receives the waters of the Spokane, offers, however, good grazing-grounds for the Indian horses.

In the grass surrounding our camp are quantities of the Western Pond Turtle (*Actinemys marmorata*), large and small—tiny little fellows not bigger than a horse-bean, and stout

* Journal Linnæan Society, 1863, 'Botany of North-west America.'

old males and females. They seem to have left the water all at the same time; the females are busy depositing their eggs in hollow places under the wild-sage bushes, or amidst tufts of grass; but why the little ones come on land as well, puzzles me. It is next to impossible to catch them when in the water; their habit is to come out on the edge of the pond or stream, or what they like better is to scramble up on a floating log, and enjoy the sunshine as it drifts about. The slightest noise at once sends them, hurry-scurry, to the bottom. Now I can pick them up as easily as I could hedge-snails in Devonshire; they do not even attempt to get out of the way.

The eggs are white, and devoid of shelly covering, the contents being enclosed in a tough membrane. I discovered about fifteen in each nest, deposited in a heap, very similar to the way our British garden-snail deposits its eggs in holes in the earth. The sun hatches them, and I much regret that I could not ascertain how long a time the eggs take to hatch by the sun's heat; we had to proceed on our journey, so I was obliged, though reluctantly, to abandon this interesting investigation. The markings on the carapace are exceedingly pretty. The general colour is olive, with darker mottlings, the under-portion (or

‘plastron’) being a brilliant yellow. I believe this is the only species of freshwater turtle found in the waters of British Columbia; its adult size is about nine inches in length, and eight in width.

In ferreting out the turtle’s eggs, I constantly disturbed the beautiful little Sage Rabbit; scarcely ten inches in length, it looks more like a rat than a rabbit, when scudding nimbly away amidst the grass. The fur is light-grey, and very like the sand and dry leaves amidst which it delights to sit. The Wasco Indians call it *Za-lak*.

I procured specimens of this rabbit at the Dalles, Cow Creek, and Colville; its favourite haunts are the narrow belts of scrub that fringe the banks of streams, hiding in crevices or among the débris at the base of a cliff, or, failing these places of concealment, makes burrows in the sandbanks; it breeds early. I obtained a doe in March, heavy with young, and am disposed to think this rabbit is only found east of the Cascades.

I found, in rambling over the sandy plain near old Fort Walla-walla, numbers of flint implements, together with heaps of fragments. At some remote period of time not easy to discover, the Indians evidently made their arrow-heads and other implements of flint at this place. The stone of which they were made could not have been





AN INDIAN BURIAL-GROUND.

Skull on the extreme left altered from circular pressure.
That on the right flattened.
In the center retaining its normal shape.

obtained nearer than at the Cascades (previously described in vol. i.), and must have been either traded from the Indians inhabiting that district, or brought from there by themselves.

I am disposed to think a regular flint trade was carried on by these inland tribes, at some remote period. with the tribes living on the seaboard and lower parts of the Columbia. Not only were flints traded, but dentalia (tooth-shells), mother-o'-pearl, and the barnacle parasitic on the back of the whale. I dug ornaments made from the three marine productions from out a gravel-bank, together with the centre skull in an Indian burial-ground (which it will be observed in the illustration* is unaltered by pressure during infancy), and a number of arrow-heads, fragments, and scrapers, made from flint, or other hard material, which must have been brought a very long distance, as it has no representative in any rock found in the immediate neighbourhood.

The place from whence I obtained these singular relics was a gravel-bank, near Fort Colville, whilst digging out the nests of sand-martins. From the way in which the various things were

scattered about, their height above the river, together with many minor matters, induces me to think the place could never have been used as a burial-ground. I merely state the fact, incidentally of considerable interest to me, as bearing on the past history of the North-western tribes.

We left Walla-walla on June 28, *en route* northward, to reach Fort Colville. I resume my journal:—

July 2.—We are on the bank of the Snake river, one of the larger tributaries to the Columbia; the river is 400 yards in width, and running like a mill-race. There had once been a ferry, in the shape of a large scow, that was worked from side to side by a truck-wheel traversing on an iron-wire rope, strained across the river; but, unluckily, the rope was broken, so we had to cross by sailing and paddling the scow, and a few canoes hired from the Indians. It was a most wearisome job, as the scow had to be towed on both sides of the river, far above the landing she had to reach, in order to compensate for the swift current. Crossing occupied the entire day, but success finally crowned our exertions.

A short distance above where we are crossing I can see the mouth of the Pelouse river, a good-

sized stream. The scenery is generally wild and massive; in every direction immense walls of rocks shut in the Snake river—bare, black, and desolate; not a tree or shrub grows from amidst their craggy ledges. I am told the course of this river may be followed for days in some places, and by no possible means can its waters be reached, so that one might die from thirst although on the bank of a river.

One thing struck me as being very remarkable; up the steepish ledges of these rocky cliffs were trails, beaten bare as turnpike-roads, and so numerous that they almost resembled lines on a railway-map. At first I thought goats must have made them, but on enquiry I discover the paths are used by the Indian horses that belonged to the Pelouse tribe. The mustangs scramble up these precipitous tracts, to browse on the scanty herbage that grows in the clefts and on the ledges of the rocks. The Pelouse Indians were at one time numerous, predatory, and always at war, but this once-dreaded tribe has dwindled away to a mere remnant.

Those that are left exist, rather than live, by fishing, shooting a few birds, and trapping small animals that frequent the plains and streams adjacent to their village on the Pelouse. Their

horses too have nearly all been taken from them, and the trails intersecting the hills are about the only records remaining of the herds of mustangs that once scrambled over their rocky slopes. Those of the Pelouse Indians I saw were fine athletic men for savages, but dirty, idle, and greedy to an unusual degree. Their canoes are clumsily dug out, and their lodges are made of rush and bark mats.

July 3.—We make an early start; I leave the mule-train to follow the course of the Pelouse river. The stream forces its way for many miles between vertical walls of basaltic rock; when standing on the edge of the *cañon*, I look down at the surging water, 200 feet below me, and often more; the faces of the rock-walls are quite as smooth as if some giant had hammer-dressed them. I have never seen a more grand or stranger-looking waterfall than is this of the Lower Pelouse. The trail I follow is about a quarter of a mile from the river, winding in tortuous course between immense fragments of rock, that completely hide the country to my left; ahead, a line of splintered peaks denotes the course of the river *cañon*; behind, I gaze back upon the Snake river, and the stupendous cliffs beetling over its frothy

water; to my right, a grassy slope, smooth and green as a well-kept lawn, extends for miles, until lost in the distant haze. A heavy thundering sound directs me to the cataract, which is at present hidden. I walk down the slope, and unexpectedly reach the edge of a narrow channel, about thirty feet in width and three hundred in depth.

Not a hundred yards from where I stand, the entire river plunges over a vertical face of smooth rocks; down it surges a depth of 300 feet, and possibly more, into the narrow channel into which I am looking. The singularity of this fall consists in the extremely narrow channel of basaltic rock through which the entire river is obliged to make its way before it dashes down this wondrous cliff. The river, at least a hundred feet wide on the plain, is narrowed to about thirty at the place where it falls over the rocks; hence the water leaps, if I may so express it, some distance from the rock on emerging from this natural launder, and falls vertically into the black chasm with a deafening roar like perpetual thunder.

The sun shining brightly lights up the gloomy chasm, and gives the foaming current a brilliancy unlike anything I have ever seen—an effect

heightened and intensified by contrast. I may aptly liken it, without any attempt at word-painting, to a stream of liquid silver flowing through a channel of jet. As the rays of light mingle with the spray, that hangs like a dense fog round the watery column, their prismatic colours are reflected from myriads of tiny water-drops, making fairy rainbows, that dance in mazy clusters from the base to the summit of the fall. Not a tree or shrub is anywhere visible, nothing but rock and water—a scene matchless in its immensity. I am not so much charmed with the beauty of this wild landscape, as awed and (if I may so express it) absorbed and lost in wonder; its sublime grandeur impresses me with a feeling that it is something more than earthly.

As I leave the fall, to retrace my steps to where I have tethered my horse, a large grey wolf sits eyeing me greedily. Turning from a scene that made me feel as a diatom might be supposed to feel in the jaws of a whale, to stand face to face with a large animal, that would eat me if he dared, for the moment so startled me, that I hesitated whether I should avoid my foe or fire at him; the latter inclination prevailed. Dropping on one knee, I drew a steady bead upon the wolf; and ere the crack of the rifle was lost in the

roar of the water, the beast that had presumed to intercept my path lay dead amidst the bright-green grass. The Grey Wolf (*Canis*, Var.; *Griseo albus*, Richardson) grows in North-western America, when well-fed, to a very large size; naturally cowardly, it seldom attacks man, except when driven by hunger. I met with three species in British Columbia—the one just alluded to, the Red Wolf (*C. occidentalis*), and the ‘Cayote’ (*C. latrans*). The Indians trap a great many wolves, their skins forming an important item in the fur-trade. One I brought home, a grey wolf, obtained at Colville (now in the British Museum collection) weighed ninety pounds, although this is not half the weight they attain on the Buffalo plains.

Found the mule-train and party encamped at the Upper Pelouse falls—very pretty, but tame and insignificant after viewing the lower cascade. Nothing of any interest, as we travel continuously over the same description of sandy treeless ground. I collected some beetles, most of them new species, described in the Appendix.

July 6.—We pass a lake called the ‘Big Lake,’ why I cannot imagine, as it is only about ten miles in length, and eleven in width; altitude, 2,000 feet above the sea-level. In the spring

and fall numbers of Indians resort to this lake to kill wildfowl, that rest on its waters during their migrations north and south. Swans and geese are most sought after, the following species being common:—

AMERICAN SWAN (*Cygnus Americanus*, Sharpless).—This handsome swan is common on all the lakes and rivers east and west of the Cascade Mountains. I saw them on the Sumass lake as late as October, the young at that time being quite brown; their breeding haunts, I imagine, are much farther north.

TRUMPETER SWAN (*Cygnus baccinator*, Richardson).—This magnificent bird is not nearly as often seen as the preceding. I obtained a fine specimen at Fort Rupert, and have occasionally seen it both on the Fraser and Columbia rivers; they go very far north to breed. The Indians skin the swans, and trade them with the Hudson's Bay Company, who buy them for swan's-down.

SNOW GOOSE (*Anser hyperboreus*, Pallas).—Common east and west of the Cascades, stopping for a short time in the prairies inland, and the sand-bars along the coast, as it goes north, and on its returning after the breeding season. I obtained a fine specimen at Nainimo in October.

The Indians kill large numbers of them, and for the table they certainly excel any of the other species.

WHITE-FRONTED GOOSE, OR LAUGHING GOOSE (*Anser Gambelii*, Hartland).—I noticed this singular goose to be much more abundant on the west than it is on the eastern side of the Cascades. Immense flocks arrive, in the spring and fall of the year, on the Sumass and Chilukweyuk prairies, resting only a few days to feed; they are always in company with Hutchin's Goose. Indians kill great numbers, by making a kind of lair. They arch light sticks by fixing the ends in the ground, just high enough for a man to crawl under, and about six feet long; this they cover with grass, to resemble a mound and rushes; having crept in, the Indian lies still until a flock of geese pitch within shot; then, bowling over as many as he can, he loads again; the geese just circle round and pitch as before, and so he continues to fire until enough are slaughtered; then out he creeps, to pick up the dead and wounded.

CANADA GOOSE (*Bernicla canadensis*).—Common east and west of the Cascade Mountains; seldom seen but in pairs. In coming down from Colville to Walla-walla on our return home, in the beginning of March, I killed two Canada

geese near the Big Lake, a right-and-left shot. On opening the female, a fine fully-developed egg was discovered, the shell quite hard. I blew it, and it is now in the collection of the British Museum; that egg, I should imagine, would have been laid the next day, and must inevitably have been lost, as they breed much farther north; it is a shy, wary bird, but capital eating.

HUTCHIN'S GOOSE.—*Bernicla Hutchinsii*, Bonap.—Very abundant east and west of the Cascades and on Vancouver Island; arrives about March, going north, and returns again in September and October. Very large flocks feed on the grassy and swampy ground at the entrance to the Fraser River, and on the Sumass and Chilukweyuk prairies. It is also very plentiful in the Colville valley during the spring and fall. This goose has a most extended range. Specimens are recorded from Red River, from Hudson's Bay, from the Makenzie, from the Saskatchewan; my own from British Columbia. I also saw it in Oregon.

July 7.—It is quite delightful to find oneself again amidst trees. The Pitch pine (*Pinus ponderosa*) makes its appearance at first in scattered clumps that soon become a forest, quite devoid of underbush.

We were positively assured, that once over the Cascades, there would be no mosquitos.

If we escape the mosquitos, we are amongst enemies quite as formidable, the *Simulium* or sand-fly, and the *Tabanus* or breeze-fly. Be it known to you, ladies, that the males, or gentlemen sand-flies, brûlots of the French-Canadian trappers, are not blood-suckers, but live on flowers and sip the honey in indolent enjoyment; what should have been the gentler sex are like Dahomean Amazons, the sanguinary spirits of the tribe. In size, the sand-fly is not nearly so large as the mosquito, and, instead of being a slim, genteel blonde Madame Brûlot, is as black as a Guinea negress—her body is short and dumpy, her gauzy wings when folded nearly twice the length of the lady herself, and her legs somewhat long and slender. Her mouth is not a loveable one, being a bundle of fearful lancets, the sheath of which forms a tube through which the blood is sucked after the barbed stilettos have done their work: an icorous fluid is in all probability instilled with the puncture, hence the intense irritation arising from the wound.

Where the sand-fly lays her eggs is not, I believe, very well known, but it is more than likely that they are deposited on the stems of aquatic

plants, for the larva is easily discovered holding on to them a little below the surface of the water. He is a long, round, ugly-looking grub, divided into twelve segments or rings. The second pair of feet are prehensile, and used for holding on by. He is rather active when undisturbed, but the slightest touch and he hangs by the feet, exactly resembling then a bit of dead rush. When the larva has attained its full growth, it spins a small delicately-fine silken bag, in which it changes to the pupa state; this bag is invariably left open at the top, and, being spun the long way of the stalk to which it is affixed, the pupa is in an upright position, and the head of the pupa protrudes a little way out of the bag. Four hair-like filaments, like horns, project from the head of the pupa, and are supposed to be breathing organs. About the end of June the delicate little fly bursts from its sarcophagus, and prepares for an aerial existence; and a contrivance utterly different from the mosquito boat, yet equally beautiful and effective, aids the newly-liberated captive to escape being drowned. Maturity attained, the pupa-case splits down the back, and the end of the silken bag being open, out creeps the fly, not into the water, but into a minute silken balloon, a part of the pupa-case, or, I imagine, the

lining of it. Loose from its moorings, steadily the balloon ascends through the water with its living freight. On reaching the surface, the fly breaks through its slender walls, spreads its wings, and with a hum of delight, away goes Brûlot to revel in the sunshine amidst the leaves and flowers. I may as well describe this day's journey, the misery of which I shall never forget.

Flowers in wild profusion peep up in myriads from among the green bunch-grass; the birds are busy in every tree and bush—some building nests, others feeding their little ones. The air, heavily laden with perfume, seems too idle to move; and the great striped humble-bees, as they tumble from flower to flower, buzz a drowsy song of satisfaction. Very enjoyable but for the clouds of sand-flies that the mules and horses composing our pack-train stir up from the grass at every step, and, as if the flies have been accustomed to regale themselves daily on the blood of man and beast, at once cover the animals so thickly that they look almost black. Kicking, plunging, and even rolling on the grass avails not, to rid the tortured beasts from their assailants. Unlike the bite of a mosquito, that left only an irritable lump, blood flows from every puncture made by the terrible lancets. They waltz round my head like a

swarm of bees, and but for a net veil I luckily have with me, my face would be savagely attacked and my skin rapidly converted into a kind of wire gauze. I pick, as do each of the packers accompanying me, large bunches of leafy twigs, and whirling them round and round, strive, though vainly, to sweep the vexatious intruders away. My heart is really grieved to see the poor suffering animals—obliged, spite of every effort of tail, legs, and ears, to bear the torture without even the proverbial relief of a 'grin.' One good little mule, we call him Johnson (that being the name of his late master), grows fagged, as mules very frequently do, and when in that condition neither force nor persuasion is of the slightest use to induce them to 'move on:' all you can do is to unpack and distribute the load amongst the other mules, leaving the tired animal on the trail. After camping and supper over, a packer rides back after the missing mule, and usually has no difficulty in bringing him into camp. Poor Johnson is unpacked and left on the trail, and as we camp very soon after leaving him, two packers at once go in pursuit. Short, however, as the time and distance are, it is with immense trouble they slowly get him into camp. Such a pitiable sight as the poor beast

presents I never beheld, covered literally and truly from head to heel with sand-flies. Each of these little harpies looks pink. Their skins, stretched to a state of transparency, reveals the colour of the fluid they are gorged with. You would not know that it was a mule if you stumbled by accident on it, so fearfully is poor Johnson swollen from the poisoned punctures. We did all we could to relieve his sufferings, lit a fire, and smoked off the flies, washed and greased him, but all to no purpose. About two hours after he was brought in, he died. Who would have dreamed such pigmies could kill a powerful mule in two or three hours!

The only plan of protecting yourself and your animals is to light large smouldering fires so as to produce voluminous clouds of smoke. This the brûlots are unable to stand; the poor animals know it, and crowd round the smoking embers, hustling one another in their anxiety to be the nearest. The Indians all adopt this method, and wherever Indian horses are grazing in summer time, immense fallen trees that are sufficiently dry to burn are lighted from end to end, and round these all day long the horses crowd. At night the sand-flies give but little trouble, and, like sensible insects, take a few hours' repose. Most appro-

priately were they named 'burning flies,' for, wherever they thrust in the lancet, it is just as though a brad-awl needle had been bored slowly into one's flesh. They continue the summer through until September, but luckily are confined to particular districts. Sandy soil, and lots of water, are the essential elements conducive to their welfare and multiplication. Bad as these burning flies are, I still maintain Madam Mosquito is far the worst. The Ladies Brûlot do indulge in a short repose, but Mistress Mosquito, I believe, never winks her eyes, and is always on the move.

By *Breeze-fly* I mean flies belonging to the genus *Tabanus*, not those of the genus *Æstrus*, with which they are frequently confounded. The latter—commonly called Bot-fly, which is also a terrible pest, alike avoided by both horse and ruminant—deposits its eggs sometimes on the hair, and sometimes underneath the skin; hence animals, guided by a natural instinct, or having been the victims of a past and painful experience, all at the sound of his dreaded trumpet make the best of their way to the nearest water, into which they plunge.

On the contrary, in the Breeze-fly we have to do with a veritable *blood-sucker*, more ravenous



than would be any winged leech. There are three species, all three by far too plentiful for the comfort of either man or beast, and widely distributed in North-west America. These insects have an apparent ubiquity, and are literally everywhere. Ascend to the regions of eternal snow, there are hungry Breeze-flies awaiting one's arrival; by the rushing torrent, on the shores of the placid lake, under the deep damp shadows of the pine-trees, or on the open flower-decked prairie, there are sure to be Breeze-flies. One barely hears the sound of its 'clarion shrill' and hum of the rapidly-vibrating wings, ere one feels a sharp prick, as though a red-hot needle had been thrust into the flesh; stab follows stab in quick succession, and unless active measures of defence be resorted to, the skin speedily assumes the form of a sieve.

The horses and mules give immediate notice of the enemy by viciously throwing up their heads and heels, snorting, and, very possibly, indeed I may say generally, summarily discharging their loads, be they human or baggage, over their heads. Whether success attends this disagreeable habit or not, in any case a hasty retreat is made for the nearest water, where both man and beast well know the Breeze-fly seldom or never follows.

I have frequently seen a train of pack-mules completely scattered by these formidable pests.

The largest and fiercest is the Black Breeze-fly (*Tabanus atratus*). His body is like glossy black velvet, frosted over with a delicate white bloom, like a freshly-gathered Orleans plum; it is about an inch in length; the wings, like pale blue gauze, when at rest are always kept in a horizontal position; the alulets are large and strong. The eyes are exquisitely beautiful, in colour dark-blue, but glittering with the lustre of highly-polished gems, and nearly covering the entire head.

The next in size is the Belted Breeze-fly (*Tabanus cinctus*), about one-third smaller than his sable brother. He is clad in bright orange livery, banded with stripes almost black; and has a most showy appearance, being decidedly the best dressed fly of the family. The eyes are emerald green, and, when viewed in the bright sunlight, have the appearance of being cut into numerous facets.

The third or smallest is the Lined Breeze-fly (*Tabanus lineatus*), of a bluish colour, and marked only with a white line along the top of the head. In this fly the eyes are of bluish-green, and quite as beautiful as in the two preceding.

The Lady Breeze-fly, I am grieved to say, is far more to be dreaded than her lord. These insects can never, one would suppose, enjoy the luxury and delight, or whatever may be the proper term applicable to such a universal habit as kissing. How could a winged lady, I should like to know, be kissed by a winged wooer when her lips are a bundle of lancets, six in number, and as sharp as a surgeon's? True the male has four blade-like instruments arming the mouth, but it is questionable whether he uses them for other purposes than that of sucking nectar from flowers. The apparatus of the female is beautifully adapted for puncturing the skin and then pumping up the fluid through the sheath of the lancets, that acts as a tube or canula. It would be of trifling interest to advert more in detail to the minute anatomy of these insects; that can be better learned from works on structural entomology; the habits of the insect, in far-away lands, sketched from personal gleanings, being more strictly my province. The rambler alone has an opportunity to investigate the haunts and watch the habits of strange beasts, birds, and insects; to the anatomist, at home in cosy closet, belongs the task of developing, with scalpel and microscope, the complicated

machinery by which life's varied duties are carried on.

The larva lives in the earth, a grub easily dug up in the moist prairie lands; of an elongated sub-cylindrical form, tapering off towards each extremity; its colour a dingy yellow; destitute of feet; having a body divided into twelve segments, each segment being banded with a row of minute horny hooks—an admirable contrivance, enabling it to drag itself along through the earth. The head is horny, and brownish-yellow in colour, also armed with hooks to aid in progression. The pupa I have never seen, but De Geer tells us the pupa of *Tabanus bovinus* is 'naked, incomplete, elongated, sub-cylindrical, with six spines at the end of the body, the margins of the abdominal segments ciliated, and the forehead bi-tubercled.'

Where or when the eggs of the *Tabanidæ* are deposited is not generally known, but it is more than probable on the stems of plants, to which they are fastened by a glutinous secretion; the grub, when hatched, falling on the ground, at once buries itself. Neither is it known how long a time the larva remains in the earth ere it changes to the pupa form.

I remember once being busily occupied all

day collecting beetles and other insects in the dense, shady pine forests, close to a small stream called the Selecé, that flows down the western slope of the Cascade mountains: boxes, bottles, bags, even my hat, indeed every available locality about my person was appropriated to the stowage and transport of the proceeds of my hunt. My mustang had been tethered close to the water, and had thus kept clear of the Breeze-flies during my absence; soon, however, after mounting him to return, emerging from the forest, I came on a small patch of open prairie land, but no sooner was I clear of the timber than the pests were at us. My beast commenced practising every species of jump and leap that it was possible for a horse to execute, and several of them of a nature so extraordinary that one would have thought no animal that ever went on four legs could accomplish; he pranced, shied, kicked, leaped forward, backward, sideways—in a word, performed such demoniacal pranks, that, although a practised horseman, I found it a most difficult matter to keep my seat. As a finale, off he went like a mad creature, caring nothing for all my efforts to stop him: then, as if from sheer madness caused by the punctures of the flies, that followed like a swarm of enraged bees, he stopped suddenly short,

viciously threw his head between his forelegs, and at the same time elevated his hind ones into the air; the whole being performed with such sudden and savage violence that I was pitched clean out of the saddle: boxes, bottles, bags, together with all my insect treasures, lay scattered over the prairie, and ere I could regain my feet I had the satisfaction of seeing him put his legs into the bridle-reins, drag it clean off his head, and, with a snort that sounded mightily like a derisive horse laugh, he galloped off, leaving me to my own devices. I mention this little adventure to show how terribly these pests can madden an animal.

From an intimacy by no means sought, or on my part cultivated, with the *Tabanidæ*, or Breeze-flies, I am disposed to think the fly called *Zimb*, and described by Bruce, belonged to this family, and was not an *Æstrus*, as many have supposed. Speaking of the *Zimb*, in reference to the camel and elephant: 'When the first of these animals are attacked, its body, head, and legs break out into large bosses, which swell, burst and putrefy, to its certain destruction.' Just such effects have I again and again seen amongst horses and mules. One mule we had to abandon on the prairie (a disabled foot preventing its travelling any farther)

was, when we returned for it, so stung by the Breeze-flies as to be one mass of small ichorous ulcers from head to hoofs; so pitiable was the poor beast's plight, its injured limb having precluded all chance of escape from the flies, that, as a mere matter of humanity, it was at once shot. I have also frequently seen tethered horses so injured by the punctures of the Breeze-fly as to be rendered useless for many months. Their favourite places for puncturing are on the front of the chest—where the saddle goes,—and inside the thighs. If a man were tied or otherwise disabled, so that all chance of beating off or escaping from the Breeze-fly was out of his power, I have no hesitation in asserting my firm conviction that they would rapidly kill him.

The Belted Breeze-fly is most abundant, a lady charmingly dressed in orange flounced with black, very attractive when you see her sunning herself amid the petals of some prairie flower, but a closer acquaintance destroys the charm, as she soon lets you feel her power of wounding.

Travelling in Oregon one constantly finds one's-self on the banks of a wide glassy lake; gazing over its unrippled surface; the eye suddenly rests on what, to the inexperienced in hunter's craft, appears to be small clumps of twisted branches,

or dead and leafless tree-tops, the trunks of which are hidden in the water; but the Indian and 'trapper' discerns in a second that the apparent branches are the antlers of a herd of Wapiti that have been driven into the water by Breeze-flies. Wild cattle seek a like means of protecting themselves against such terrible foes: a perfect forest of horns may frequently be witnessed in a pool, but not a vestige of the bullocks, save their noses, kept above water for the purpose of breathing.

For the first time I notice that singular bird CLARK'S CROW, *Picicorvus Columbianus* (Bon.), hopping busily from branch to branch amidst the pine trees.

Wilson, in his 'American Ornithology,' in giving a brief notice of this bird, says: 'It is remarkable for its formidable claws, which approach to those of the *Falco* genus, and would seem to intimate that its food consists of living animals, for whose destruction these *weapons* must be *necessary*. It inhabits the shores of the Columbia, frequenting the rivers and sea-shore, probably feeding on fish.' There never could have been a greater mistake; the bird never frequents the river banks, never by any chance eats fish, and would no more attempt the capture of other living things than would a turtle-dove or a canary-bird.

Its habits are strictly arboreal, its food the seeds of the pine-trees. Watching a flock of these busy, noisy seed-hunters, one notices at a glance how curiously they hang on to the cones; and five minutes' observation tells you what the claws, so falcon-like in appearance, are for better than a month's guessing.

Clark's 'crows' have, like the cross-bills, to get out the seeds from underneath the scaly coverings constituting the outward side of a fir cone; nature has not given them crossed-mandibles to lever open the scales, but instead, feet and claws that serve the purpose of hands, and a powerful bill, like a small crowbar. To use the crowbar to advantage, the cone needs steadying, or it would snap at the stem and fall; to accomplish this, one foot clasps it, and the powerful claws hold it firmly, whilst the other foot, encircling the branch, supports the bird, either back downward, head downward, on its side, or upright like a woodpecker, the long grasping claws being equal to any emergency: the cone thus fixed and a firm hold maintained on the branch, the seeds are gouged out from under the scales. I have now a large packet of seeds, some of which have been grown (the seeds of *Abies Douglassii*), that I cut from the crops of 'Clark's Crows;' indeed it is next to

impossible to obtain the seeds of some of the very tall pines in any other way, a cruel system of collecting I should ever discountenance, if the poor birds were sacrificed merely with the hope of obtaining seeds from their crops. Those killed were for specimens to bring home. A few winter in British Columbia, but the larger proportion go southward in September. On their arrival in May, or early in June, they assemble in immense flocks, and so terribly loud is the noise they make, that you can hardly hear the sound of your own or others' voice; a most discordant, continuous, grating ~~clatter~~, intensified at times into a perfect shriek. These assemblies only last about a week, during which time the wooing is done, and marriages celebrated, the favoured birds getting such fair ones as they choose, the less fortunate such as they can.

The pairs then depart, to perform the all-important duties of nesting. The nest I saw (I never succeeded in finding more than one) was in the top of a lofty pine-tree, at least 200 feet high; the tree was felled in cutting the Boundary line, and by chance I discovered the nest. The eggs were of course smashed to atoms, but the old birds hovered round and even perched on the ruins of their nursery, leaving no

doubt about its being the nest of 'Clark's Crow.'

The nest was very large, and composed of fir-twigs, bits of bark, the bracts or leaves of the pine, and fine root-fibres; some small pieces of moss and grey lichen were mixed carelessly with the other materials. The shape was difficult to make out, as the crash of the falling tree had damaged it considerably; but I should say it was shallow, round, and presenting a large extent of surface beyond the margins of the hollow containing the eggs. The remains of about four eggs were, I should think, scattered round, the fragments much like the eggs of Steller's Jay in colour, but of a lighter shade of bluish-green. From the fact of my never by any chance finding a nest low down, I imagine their habit is always to build in the very tallest pines. West of the Cascades I believe it is unknown, that ridge of mountains being its boundary northward. Its size is about that of a pigeon; length 12 inches, wing $7\frac{1}{4}$, tail $4\frac{1}{2}$, tarsus $1\frac{1}{2}$. Colour, bluish-ash, lighter on the forehead and round the eyes. Wings nearly black, with a shade of green overspreading it. Secondaries and tertials (except the innermost) tipped broadly with white; tail white, the inner webs of the fifth and the whole

of the sixth feather black. Tail-coverts same colour as wings.

July 8.—After crossing a very high ridge we look suddenly down into the valley of the Spokan river. The river has a very rapid flow, and where we ferry it, in a scow worked by a rope from side to side, it is about 150 yards wide. The charge for crossing was, I think, a dollar (4s.) per head for packed mules; the cattle swam it.

We camp on a grassy flat, known as Walker's Prairie, a few miles from the ferry, where a solitary settler keeps a rough kind of inn. I wander across the prairie, and am amused with the freaks of the ground-squirrels (*Spermophilus Parryi*, Richardson); they live in burrows dug in all directions into mounds, which mounds, I think, are not made by the squirrels. By keeping still I soon saw numbers of them emerge from their holes, chase one another round the hillock, up one side, down the other, as if they were occupied in playing some game fashionable in squirrel-dom. If I move or otherwise make my presence known, shrill whistles oft repeated warn the assemblage that danger is at hand; each at once makes for its hole and disappears. In coming from out their burrows, their habit is to sit upon their haunches at the entrance, and with their tiny

forefeet brush the whiskers, ears, eyes, and head in general, I suppose, to remove particles of dirt accumulated in passing through the tunnel.

It is curious to note how three species of ground-squirrels have replaced each other in accordance with the change of vegetation in our transit from the Dalles to where we are now encamped.

At the Dalles we saw *Spermophilus Douglassii*, the Columbia Ground Squirrel (described in vol. i.), extending only as far as the scrub-oak grew, the Fall river being its boundary going north towards Colville.

Betwixt the Fall river and the Spokane, inhabiting the sandy and woodless plains, Richardson's Ground Squirrel (*S. Richardsonii*, Cuv.) is alone found. After crossing the Spokane and getting into the timbered regions, the ground-squirrel I have been looking at takes its place, and extends from the Spokane to the slopes of the Rocky Mountains.

July 9.—To-day we have a charming drive through grass and open timbered land, like a succession of beautiful parks. Cross several small streams, icy cold, but clear as crystal. By these rivulets I noticed Parkman's Wren (*Troglodytes Parkmannii*, Aud.).

It is difficult to watch its movements, so diminutive is it in size, and yet so quick withal. The mellow song of the wrens seems almost like fairy music; and sounds so delicately sweet appear to be out of place amidst such giant trees.

The nest is in shape like that of our household pets, built against a dead stump, or in the deep clefts in the bark of a pine-tree which are often taken advantage of, to act as lateral walls. Its skill in imitating the colour and appearance of the bark is perfectly wonderful: even when one has watched the bird go in, it is most difficult to make out that it is a nest and not real bark; take the eye off the spot but an instant, and goodbye to finding the nest again, except the birds go in and out. They build in June, six or seven eggs being generally laid, and arrive about the middle of May, leaving in September, young and old together.

Nuthatches were busy in nearly every pine-tree, with their constant companions the restless tits. The three species common in the forests east of the Cascades are:—

THE SLENDER-BILL NUTHATCH (*Sitta aculeata*, Cassin).—This nuthatch is very abundant in the pine-forests from the coast to the Rocky

Mountains; never seen in large flocks, but usually alone, or in twos and threes. Remained about Colville during the winter, when the temperature was 30° below zero. Nests in holes in the branches of the tallest pine-trees, so high as to render getting the eggs almost an impossibility. They nest early in June.

RED-BELLIED NUTHATCH (*Sitta canadensis*, Linn.).—Very common on Vancouver Island and on the Sumass prairies, but rather a rare bird between the Cascades and Rocky Mountains. I have seldom seen more than one or two together, and then generally in dark swampy places. Nests in holes in dead trees; eggs laid on the dust made in working out the hole.

CALIFORNIA NUTHATCH. (*Sitta pygmaea*, Vigors).—An abundant little bird along the entire length of the Boundary-line from the coast to the Rocky Mountains, also common on Vancouver Island: you always see these little fellows in large flocks in company with the Chickadees, except during the nesting-time, which is in June. A few remain about Colville during the winter, but the greater portion leave in November.

These most active birds are always on the move; after nesting-time they congregate in large flocks, and, rejoining their companions the

tits and golden-crests, fly on without any apparent care as to direction—constantly flitting from tree to tree, twittering a low sweet note, as if singing to themselves—sometimes climbing back downwards along the under-sides of the topmost branches of the tall pines, peering into every crevice for insect-hiders; at others, descending to the ground, they cling to the slender flower-stalks to catch drowsy insects, sipping the sweets stored in these perfumed drinking-places.

They nest in June, making a hole in the dead branch of a pine-tree; there is no lining in the hole, but the eggs are laid on the dust made in enlarging or boring it. Eggs in British Museum collection from Colville. They range northward to Fort Simpson, and southward through Oregon and California. This applies to all three species.

The following four species represent the
Tits:—

WESTERN TITMOUSE (*Parus occidentalis*, Baird).—Common on Vancouver Island and along the whole course of the Boundary line to the summit of the Rocky Mountains. A few remain during the winter at Colville, but the greater portion leave in November and arrive again in April; they nest in June, choosing a hole in a dead tree; line the nest with grass and

feathers; after the nesting-time they assemble in large flocks, and feed in company with the Mountain Tit and the Golden-crested Wrens, then keep together until they take their departure south.

MOUNTAIN TITMOUSE (*Parus montanus*, Gambel).—This bird has just the same range and distribution as the preceding, and agrees with it in habit, periods of migration, and nesting time, but it is not nearly so plentiful.

CHESTNUT-BACKED TITMOUSE (*Parus rufescens*, Townsend).—This little fellow is very abundant on the Sumass prairies, and along the Fraser river, but rare between the Cascades and Rocky Mountains. I met with it at Colville, in company with a flock of Golden-crested Wrens, and once at Syniakwateen; hence I am disposed to think it is more common along the coast-line than in the interior. It arrives in May, and leaves again in September. I never found its nest. The northern range of these tits is about lat. 53° N., and south through Oregon and California.

LEAST TIT (*Psaltriparus minimus*, Bonap.).—I saw this tiny tit but twice, at Sumass prairie and on the Nesqually plains, but had no opportunities to observe its habits. I expect it is more plentiful than one would imagine; its

small size, and habit of hiding in thick brush, renders it extremely difficult to find.

We camp at a place called 'Dead Man's Prairie.' Three roughly-made crosses denote the graves of three men, who (so the story goes) lost their way on this prairie, and having no provisions, dug roots to live on; but not knowing the edible from the poisonous varieties, ate some bulbs that killed all three of them; their bodies were discovered and buried, and the place has been named Dead Man's Prairie ever since.

From this not very cheering spot we follow up the Colville valley, pass by some very good farms, where excellent grain and vegetables are grown; and on the 12th reach our destination, Fort Colville, already described in vol. i., in the chapter on Salmon Fishing at the Kettle Falls (page 71).

CHAPTER VII.

THE COLVILLE VALLEY OUR HEADQUARTERS—THE WHITE-BELLIED SWALLOW — CLIFF SWALLOW — BANK SWALLOW — ROUGH-WINGED SWALLOW—BARN SWALLOW AND ITS STRANGE NESTING-PLACE — VIOLET-GREEN SWALLOW — WESTERN MEADOW LARK — TOWNSEND'S FLYCATCHER — AMERICAN RAVENS — BULLOCK'S ORIOLE—BREWER'S BLACKBIRD OR WESTERN GRACKLE OR CANADA VAY—WHISKY JACK—LESSER REDPOLE — THE LAZULI FINCH — OREGON GROUND ROBIN—GREY-CROWNED FINCH.

THE United States Boundary Commission were stationed about eighteen miles from the Hudson's Bay Company's fort. It would be of little interest to recount the building of our log-quarters, stowing provisions, and completing all the requisite arrangements for the coming winter. It will suffice to say, all was satisfactorily arranged, and ample provision made for the commissariat of both men and animals.

Colville valley, in which we erected our headquarters, does not belong to British Columbia, but is in American territory. There was no

other place north of the Boundary line, as it passes the Columbia, so well suited for the purposes of the Commission as this valley—hence the Commissioner fixed on it as our headquarters. It was a glorious place for birds: which were in great force. All my notes on the habits of the different species of birds I observed, shot, and brought home, would fill a ponderous volume; the full list of species is given in the Appendix. For special description a few groups are selected, whose habits are not generally known, or which vary in accordance with local modifying causes—matters always interesting to the general reader as well as to the naturalist. Swallows are always in great abundance, arriving from southward when the insects make their appearance.

THE WHITE-BELLIED SWALLOW (*Hirundo bicolor*, Vieillot) is one of the most abundant species visiting Vancouver Island and British Columbia, reaching an altitude, on the Cascades and Rocky Mountains, of 7,000 feet above the sea-level. Its favourite hawking-grounds are the open prairies, or round the margin and over the surfaces of lakes, large and small.

Unlike the species next described, this swallow always builds its nest in dead willow or cottonwood trees, and lines it with ducks' feathers.

I am quite sure these swallows dig a hole in the solid tree, a feat their soft beaks appear hardly fitted for, inasmuch as I saw one begun and finished at the Sumass prairie, where great numbers of swallows annually resort to build, finding there an abundance of the favourite soft willow-wood.

CLIFF SWALLOW (*Hirundo lunifrons*, Say).

—I never saw this bird on the west side of the Cascades, but it is very abundant between the Cascades and Rocky Mountains. Arrives at Colville in May and June, in immense flocks. On arriving they at once fix on some steep rock with an exposed surface; days and days are spent in whirling round and round this intended building-site, chattering, and clearly having warm and angry debates, about the summer labour; they at last adjust all preliminary arrangements, then set to work in earnest.

Cliff-swallows are the most sociable of birds, and work together in hundreds, side by side, on very amicable terms. The nests are made of mud; in shape like a retort, with long narrow neck like a chimney, which the birds creep through to reach the globular nest; this neck is artfully bent, to prevent the eggs or young from falling out. A form of nest clearly designed to prevent the ac-

cess of wet, and act as a safeguard against the depredations of birds of prey, a highly necessary precaution; the nest, placed on a bare surface of rock, unsheltered by even a leaf, is visible to every passing plunderer; and further, its form shades the sitting bird from the intense heat of the sun.

Frequently fifteen or twenty nests are piled on one another, their long tubular mud entrances sticking out in all directions. It is a pretty sight in a houseless country to watch these feathered masons, always suggestive of home, and the familiar martin, that builds its mud-nurseries under the eaves of our residences, recalling sad though pleasant memories of friends far away, perhaps, like I am, watching the mason-birds.

After nesting-time they abandon the rock with their families, and scatter over the prairies, reassembling, prior to their final start for the south, in September; the nesting-time is in June, five eggs being usually the number laid.

BANK SWALLOW (*Cotyle riparia*, Boir).—These arrive at Colville in May and June, but somewhat earlier along the coast and at Vancouver Island. They are widely distributed, and generally frequent the larger river-banks. On their first arrival they assemble in immense numbers, sometimes so completely covering a dead

tree as to stand on one another for lack of room; then they pair, and make their nests in sand-banks, digging about fifteen or twenty inches in; line the hole with grass and the fronds of the pine-tree. They leave again in September. Lay four or five eggs.

ROUGH-WINGED SWALLOW. (*Cotyle serripennis*, Bonap.).—This swallow arrives about the same time as the sand-martin, and has much the same habits and distribution, but differs in its choice of nesting-place. Like the woodpecker, this bird either makes a hole in a dead pine-tree, or, taking possession of one already made therein, builds a nest of feathers and deer-hairs, lays four or five eggs, and fetches out its brood in July. The eggs are most difficult to obtain, the trees selected for nesting being usually too rotten to climb.

BARN SWALLOWS (*Hirundo horreorum*, Barton) are common on Vancouver Island, and on both sides of the Cascade Mountains. They arrive at Colville in May and June, and build either under a ledge of rock, or in an old out-building, if such can be found.

Whilst at our depôt at Syniakwateen (vide illustration in Volume I.) a solitary pair of barn-swallows paid us a visit. A small shanty

stood a short distance from the log-huts, loosely built with poles, and shingled over to keep out the rain, in which our two blacksmiths were always at work. Early on a summer morning, towards the end of June, my attention was directed to two barn-swallows perched on the roof of the little shed. They did not exhibit the slightest fear or alarm, although the bellows snorted and wheezed, and sent myriads of brilliant sparks from the crackling charcoal dancing into the air; whilst the hammer, plied by a lusty arm, rang a merry peal as it smote the ruddy iron. Presently off they flew, and circling round entered the house, and carefully examined the poles supporting the roof. Perching on them here and there, they felt the surface with their beaks, then twittered in the most excited manner to each other. This system of selecting a site was repeated several times, until the question was evidently settled and decided upon.

The following day the foundation-stone was laid, a tiny bit of mud being affixed to the beam just over the anvil; and although the hammer constantly passed close to the birds and their building, still they went steadily on with their work. In about three days the nest began to

assume a rough outline of what its form was eventually to be; its shape, when completed, being very like the half of a teacup stuck against a wall. Being curious to see from whence they procured their building materials, I tracked them to the edge of the stream, where, on a tiny kind of beach, they worked up the clay and fine sand into mortar with their delicate beaks. For days these feathered architects, with unwearying patience, journeyed to and from the brick-field, making their own bricks, carrying them home, and carefully laying them.

The house is built; and next to furnish it. First of all, minute bits of soft dry grass were brought, and laid on the bottom, and round the rough walls; this occupied about two days; then excursions had to be made along the banks of the stream, where ducks' feathers and bits of goose-down were picked up, brought home, and neatly deposited on the grass lining, until the inside was made as smooth and soft as an eider-down pillow. The trustful couple knew no fear. I frequently stood on a log to watch them, their feathers touching my face as they toiled at their brickwork—twisting, shaping, fitting, and gluing the bricks together with an adhesive salivary secretion.

Three days after the work was completed, the first egg was laid, and then one on every second day, until five were in the nest, and the process of incubation commenced. As far as I could observe, the eggs were never uncovered. The hen-bird sat by far the greater part of the time, but, on her leaving the nest to feed, the male invariably took her place. In time, five infant swallows—that, to perpetrate a pun, were veritably *all swallow*—gaped greedily for food. Hard the couple toiled, to feed their hungry family. As the little ones grew and thrived, their residence was too small to hold them; a daring spirit came with their feathers, and, becoming strong, they made rash attempts to scramble out on the edge of the nest, and there, in the most unsteady manner, to balance themselves until angrily knocked in again on the return of the old birds.

At last they abandoned their nursery, and three succeeded in getting upon the pole to which the nest was attached, and two fell on the floor; and what might have been their fate I do not know, if the old Vulcans had not picked them up and placed them with their brethren. A few days' training taught the fledglings the use of their wings; then taking their departure from the shanty, the family started to brave the perils of

the world. Where white man's foot had never trodden before—in the solitude of a primeval forest, in a rough shanty formed by human hands, where the roaring bellows and clanging hammer kept chorus all day long—there two swallows, trusting that man would harm them not, erected their mansion, watched and reared their children. Where they would have built their house had not man's handiwork provided them with a site, I hardly know. I never but once again saw this swallow's nest, and this was built under a bridge we made across a small stream. I suppose they must find old caverns or holes in the rocks, for, being an open nest, it must be sheltered from the rain.

VIOLET-GREEN SWALLOW (*Hirundo Thallassina*, Swainson). — This beautiful swallow is common from the coast, along the entire course of the Boundary-line, to the summit of the Rocky Mountains. They are amongst the earliest visitors at Colville, arriving in small flocks in March, but in greater numbers in May and June. They build in June, making their nests in holes in dead trees, as high as they can get, and lay four or five eggs. The nest is made of feathers and soft hair. I am pretty sure their nesting-holes are excavated in the soft wood by

themselves; although their soft purple beak appears ill-adapted to perform such labour, although the wood, being soft from decay, easily crumbles. They assemble in large flocks before migrating in September.

WESTERN MEADOW LARK (*Sturnella neglecta*, Aud.).—After being shut up, and closely imprisoned by the bitter cold and deep snows of a North-western winter, one hails with delight the first heralds, announcing the prospect of speedy relief—sunshine and summer. The meadow-larks (or starlings, more correctly) are amongst the earliest arrivals, making their appearance in the interior of British Columbia, before the snow has begun to thaw even from the roofs of the log-huts.

Their custom, on first arriving, is to sit on the extreme tops of the sprays that project above the snow. The brilliant golden-yellow, decking their breasts, and the rich browns on the back and wings, are in such vivid contrast with the intense white on every side, that one is almost tempted to imagine some magi's hand had conjured gorgeous blossoms on the leafless sticks; until the mellow plaintive songs, pealing over the wintry waste, tells you that life is there, with hope and confidence in coming events. Leaves, flowers, grass, insects, all are missing, still the

birds know they are sure to come; their instincts are true, and so they patiently await the change from bleak winter to genial spring, as joyous as if they had not quitted the sunny south.

The nest is made, in a very careless manner, on the open prairie: a hollow is selected (the footprint of a deer generally), in a sloping bank or knoll, and filled with dry grass-stalks, not woven together but laid one on another, like hens' nests are made with straw; sometimes, though not invariably, a few hairs are laid on the grass-stalks, but with no attempt at definite arrangement. Five or six eggs are laid early in June; after nesting, young and old flock together, until their departure in September. They are generally distributed throughout British Columbia, extending north to Sitka, and farther for aught I know; they are plentiful also on Vancouver Island, and on all the islands in the Gulf of Georgia.

TOWNSEND'S FLYCATCHER (*Myiadestes Townsendii*, Cabanis).—I met ~~with~~ these rare birds once only, and then at Colville. It was towards the end of November; deep snow was on the ground, all the leaves had fallen, and the cold was intense. My attention was first attracted by hearing a low sweet song, not unlike that of our English song-thrush, which at this time of year was a most

unusual sound. On looking round, I saw about twenty of these birds perched on the top sprays of some white-thorn bushes. In their mode of darting off and returning again to the spray, they put me in mind of the shrike. I shot six of them, and could detect no material difference in plumage between males and females; in the stomachs of those I opened were the remains of some small coleopterous insects and a few haws. They left the next day, and I never saw them again.

AMERICAN RAVENS (*Corvus carnivorus*, Bartram).—Ravens are distributed all over Northwestern America, in every part of British Columbia, from the Rocky Mountains to the seacoast—on Vancouver Island, and all the others in the Gulf of Georgia. In the forests by the rivers and lakes, on the prairies or in the swamps, ravens are always in waiting, to demolish anything they can find dead, or to slay the weak and helpless. Their migration is simply from the inland, during winter, to the seacoast. A dozen or two remained at our headquarters at Colville during the winter, contrary to their habits—induced to linger in order to feed on the offal from our slaughtering-yard. In summer they are habitually shy, and very watchful against any chance

of surprise; but deep snow, and a temperature 32° below zero, so tamed them, that they came down on the bullocks as the men were skinning them, and, though again and again knocked off, refused to leave until they had a bit given them: luckily for the ravens, the men had a superstitious dread of doing them an injury, so that they had only to fight it out with the dogs and Indian women, as to right of offals.

The nest is built of sticks, and placed on the very summit of the tallest pine-trees they can find. They build very early in May, and usually have two broods in the year. The same pair of ravens use their old nest, simply repairing the damage done by wind and weather. I have seen them so gorged with dead mules' flesh as to be unable to fly into a tree; flapping their wings, to aid in hopping the faster, they scrambled into the bushes in a most undignified manner, too full even to croak. They seldom lay more than two eggs.

BULLOCK'S ORIOLE (*Icterus bullockii*, Bonap.).— This is the only representative of the orioles in British Columbia, and by no means abundant, or often seen by visitors. These birds prefer the localities where the scrub-oak grows to the pine region, and build a long pendulous nest, beautifully woven of fibrous roots and grass-stalks.

suspending it from the point of an oak-branch, without any attempt whatever at concealment. The nest may frequently be seen dangling like a jelly-bag drying. I have previously given an account of a tree covered with their nests which I saw on the Shasta plains. From five to six eggs are laid in June. I have never seen the oriole north of the Fraser river, and but rarely east of the Cascades. A few stragglers visited our quarters in the Colville valley, which arrived late in May and left early in September, the males usually preceding the females by three or four days.

BREWER'S BLACKBIRD, OR WESTERN GRACKLE (*Scolecophagus cyanocephalus*, Cuvier).—A rare bird, I should say, in British Columbia. I have seen a few at Vancouver Island, in the yards where cattle are fed, and a small number frequented our mule-camp on the Sumass prairie. East of the Cascades I saw them only at Colville, where a small flock wintered in a settler's cow-yard. They appear to have a great liking to be near animals, arising, I presume, from their finding more food and insects there than elsewhere. They walk between the bullocks' legs, perch on their backs, deftly turning over the hair in search of parasitic pests, which they nip with their forcep-

like beaks, much to the tough-skinned ruminant's delight.

It was pleasant to watch an old ox with three or four of the blackbirds on his back, busy turning over the hairs with their beaks: the bullock, slowly shutting and opening his great watery eyes, rolling round his cud, and giving little grunts of delight, seemed to enjoy the tickling sensation (I am not sure that he knew what his feathered friends were doing for his good), as much as if a modern barber was brushing his hair by machinery. I never saw the nests of these birds, but think they build in holes in the walls, or rocks, if walls are not to be found.

CANADA JAY, OR WHISKY JACK (*Perisoreus Canadensis*, Bonap.).—This and 'Steller's Jay' are the only representatives of the jay family in British Columbia. So familiar and confiding in its habits is this plain little ash-coloured bird, and at the same time so fond of being near the habitations of man, that Canadian settlers and gold-miners of the North-west style it the Whisky Jack, never harm it, and say that wherever man goes, Whisky and Whisky Jacks invariably follow. In cold weather I have seen poor little jack hop by the fire, perch himself on a log, ruff up his feathers, and warm himself as fearlessly as

if he had been reared and tamed in a shanty; hopping round on the look-out for crumbs, he slants his head, and looks so beseechingly with his glittering grey eyes, that he must have a hard cruel heart who could refuse such an appeal for a stray morsel, or injure trustful little jack. Indian children are their greatest enemies; they never wilfully kill them, but tease the poor little fellows, until they die from sheer worry.

This jay has an immense distribution, extending from Vancouver Island through British Columbia, crossing the Rocky Mountains, and ranging down the eastern slopes into Canada; it is found also throughout the Northern United States. Its nest is, much like that of other jays, built generally in a close bush. Four to seven eggs are the usual number laid. They winter throughout British Columbia and in Vancouver Island.

LESSER REDPOLE (*Ægiothus linaria*, Cabanis).—Rather a rare bird in British Columbia; it frequents swampy places, where the alders grow thickly, and large hollow-stalked water-plants flourish. To these it clings, and swinging, as if performing a trapèze feat, pecks away at the seed-pods, and searching the flowers if there are any remaining, gobbles up any beetles that may have

therein taken refuge. The song is a pretty soft warble, that comes in bursts, as if in joyous praise of some unusually fortunate capture; the singer perching itself boldly on the top of a plant, to be the more plainly heard by its companions. In early spring the redpoles feed right-royally, the long pollen-dusted catkins of the alder and hazel being much relished. I never saw its nest, though I repeatedly searched for it. They winter in small flocks in Vancouver Island, at its southern extremity.

THE LAZULI FINCH (*Cyanospiza amœna*, Baird).—This gaily-plumaged little bird, one of the 'painted sparrows,' visits Vancouver Island and British Columbia early in the summer, arriving at the Island in May, and rather later east of the Cascades. The colours of the male are nearly as brilliant as the gemlike humming-birds, the feathers having a similar metallic lustre—a brilliancy rendered the more conspicuous by contrast with the flowerless shrubs it usually frequents. The song is feeble, and only now and then indulged in by the male, to cheer his more sombre partner during incubation.

The nest is round, and open at the top, composed of various materials turned and worked together, lined with hair, and placed in a low

bush, usually by the side of a stream. Five eggs is the number generally laid.

OREGON GROUND ROBIN (*Pepilo oregonus*, Bell).—This quaint restless bird is very abundant, from the coast to the summit of the Rocky Mountains, and is also very common on Vancouver Island. They arrive in April and May, and frequent dark woods and thick tangled underbrush. Stealthy and shy, its habit is to hide, but a love of hearing its own ugly voice invariably betrays the place of concealment. The cry—for it is not a song, but something like the squall of the cat-bird—comes from the most unlikely places, often startling one into a momentary belief in ghouls and wood demons. I found a nest, after days of tiresome waiting and watching; it was placed on the top of a stump, round which young shoots had grown like a fringe, completely hiding it from the sharpest eye; the birds descended to it through the twigs, that formed a vegetable tube. Not a neat nest, but clumsily put together with varied materials, lined with hair, and in it six eggs.

GREY-CROWNED FINCH (*Leucosticte tephrocotis*, Swainson).—My first acquaintance with this very rare and beautiful bird was made on the summit of the Cascade Mountains, on a hill we named

Ptarmigan Hill, because these grouse were so very plentiful on it. It was late in October, and we were hurrying back to winter-quarters, hourly expecting the first fall of snow. I observed a flock of nine or ten birds pecking along the ground, much as larks feed; the more I looked at them, the more I was puzzled to imagine what birds they could be, at such an altitude, so late in the year. To settle the matter I fired in amongst them, and picked up three—a female, and two males in splendid plumage. I tried for more, but never saw them again on the Cascades.

In July, in the following summer, I was on the summit of the Rocky Mountains, near the Kootanie Pass, and again saw these beautiful birds feeding on the ground. I shot several, but all of them were young birds of the year, barely fledged, or badly-plumaged old ones. Hence there can be no doubt these finches breed on the Cascades and Rocky Mountains, in both about the same altitude, 7,000 feet above the sea-level. They are very late migrants, or they winter on the mountains; although I hardly think they could bear the cold, or find a sufficiency of food, the winter being very severe, and the snow three feet and more in depth.

CHAPTER VIII.

ROUTE TO THE SUMMIT CAMP—SPOKAN PLAINS—FEARFUL DESTRUCTION OF HORSES—SYNIAKWATEEN (OR 'THE CROSSING')—A BUTTERFLY ASSEMBLAGE—THE FOX-SPARROW—GOATSUCKERS—THE OSPREY—REDSTART—LOUISIANA TANAGER—DUSKY GROUSE—FRANKLIN'S GROUSE—RUFFED GROUSE—HARRIS'S WOODPECKER—GARDNER'S WOODPECKER—WHITE-HEADED WOODPECKER—THREE-TOED WOODPECKER—LOG-CK—LEWIS'S WOODPECKER—A NEW CICADA (CICADA OCCIDENTALIS).

THE routes travelled by our various working-parties in order to reach the Summit Camp—situated on the Rocky Mountains, and the termination of the half of the Boundary Line we were commissioned to mark (the other half, east of the Rocky Mountains, the terminal point of which is at the Lake of the Woods, still remains unmarked)—ran in a southerly direction. This deviation from a more direct course was necessitated in consequence of impassable barriers of mountains, so closely piled and wooded, that the valleys between them were little else than rocky gorges, devoid of grass or other food for packed animals. Following the Colville valley for some distance, and thence through a sparsely-wooded

country we reach the Spokan plains, which are open grassy wastes, very like the barren grounds we travelled through from Walla-walla to Colville.

The Spokan Indians live principally on these plains, Gerry being their chief. Gerry speaks very understandable English, which he picked up whilst acting as guide to Sir George Simpson. This large tribe has been awfully crippled by Colonel Wright, previously spoken of as commanding the United States troops at Walla-walla. The Indians made a cowardly attack on some unarmed dragoons exercising their horses, killed several men, and stole all the horses. Colonel Wright, in retaliation, marched into their stronghold, and after a brisk skirmish, routed them, taking several of the leaders prisoners, and with them a celebrated chief. These were all hung where the fight took place. Then all the Indian horses that could be collected were driven together by order of the Colonel and shot; 700 were thus killed; three days were occupied in shooting the poor beasts down. I state the fact as it was told me.

Branching off in a north-easterly direction, the trail leads through a thickly-wooded country to the Pend Oreille river, where our depôt, Syniak-wateen (Indian, the 'crossing:' vide illustration),

was situated. The scenery is picturesque beyond description; densely wooded on each side, the river winds its way through a series of grassy banks, flat and verdant as English meadows. In June these grass-flats are flooded by the melting snows, and for a short time the river assumes the appearance of a lovely lake. The Indians *en route* to the Buffalo plains, east of the Rocky Mountains, cross the Pend Oreille at this its narrowest neck—hence the name, Syniakwateen.

The place is a perfect paradise for the lesser migrants: sunny, sheltered, and abounding in insects and flowers, the birds live sumptuously, and find in the forest-trees and shrubby underbrush every variety of site for building purposes. Few more wonderful displays of brilliant colouring can be imagined than an assemblage of butterflies. ‘Knights’ and ‘chevaliers’ have a habit, in North and North-western America, of pitching together on the ground, choosing damp bare places for their gatherings; many hundreds of these brilliantly-coloured insects might be seen every day on these meadow-like river banks, out-vying in variety of tints any grouping of flowers the most skilful gardener could produce. For what purpose they thus congregate I am at a loss to imagine.

Here I first saw the Fox Sparrow (*Passerella Townsendii*, Nuttall). This sparrow is not, however, uncommon in dark swampy places east of the Cascades. It is remarkable as possessing a most singular habit—that of scratching dead leaves or decayed material of any sort with its feet, exactly as do barndoor fowls—sending the dirt right, left, and behind; it picks up seeds, insects, larvæ, or anything eatable that it digs out, and then goes on scraping for more. The long and unusually strong claws with which this bird is provided seem particularly well adapted to this unsparrow-like mode of earning a living. If one waits quietly in a dark swamp, in a few minutes the ‘scratch, scratch’ of several of these birds is pretty sure to be heard from under the tangle of fallen timber.

From daylight until dark Goatsuckers wing their way in mazy circles, like flights of gnats on summer evenings more than insect-catching birds—so very numerous are they at this favoured locality. The continuous ‘pisk, pisk,’ and sudden booming roar they make whilst flying, is heard in every direction—high in the air, and close to one’s ear. They have various names given them, such as—

NIGHT HAWK—BULL BAT—MOSQUITO HAWK—
the GOATSUCKER (*Chordeiles popetue*, Vieill) of

zoologists.—I have met with only one well-marked species from the coast to the summit of the Rocky Mountains. They arrive at Vancouver Island and along the coast in May, and at Colville in June. On the 7th of June I observed a great number of these goatsuckers in company with what I imagined to be the Black Swift, but as they never came within range I could not determine the matter. I succeeded in getting one goatsucker, a male; its stomach was gorged with winged ants; a flight of these insects had, as I imagine, attracted these birds.

When flying high the goatsucker makes a curious kind of chirp—hence the name by which they are known throughout Oregon and California, as *Pisk*; and when they swoop down, as they constantly do, from a great height, they make a loud booming noise, almost like a *roar*, or the twang of a large metal harp-string—whence I suppose comes the other name, *Bull Bat*.

I have noticed them 7,000 feet above the sea-level, both on the Cascades and the Rocky Mountains. They lay two eggs in July, on the bare ground. They have a curious habit of pitching on the ground just as it is getting dark, and running along like a sandpiper, chasing moths and small insects. I have often seen them pitch close to my feet.

Sitting on a tree overhanging the river, or soaring gracefully high in the clear atmosphere, the Osprey or Fishing Eagle may be seen at all times.

THE AMERICAN OSPREY (*Pandion carolinensis*, Gmelin) is found on nearly every river and lake from the coast to the west slope of the Rocky Mountains; it is also quite as plentiful on the lakes and streams in Vancouver Island. They quit the streams inland on the approach of severe winter weather, and retire to the coast or go south. The nest of the osprey is a most conspicuous object, and can be seen from a long distance; it is invariably built on the extreme summit of a dead pine-tree, made of dry sticks, and in size as large as an imperial bushel.

The ospreys use the same nest year after year; the number of young is usually three. There was a particularly large nest in the centre of a small prairie through which the trail ran, leading from Sumass to the Chilukweyuk prairie: it was placed on the top of a dead pine-tree that was at least 150 feet high, and as straight and bare of branches as a flagstaff; at the base of the tree the trail forked, the other trail leading to Sweltza; the turn-off was known as the Eagle's Nest. I shot two, a male and female, in August, on the

stump of a dead tree hanging over the Kootanie river, feeling desirous to obtain specimens from that locality. Specimens were also obtained at Sumass, Vancouver Island, and Colville, and there can be no doubt there is but one species common to the entire district.

THE REDSTART (*Setophaga ruticilla*, Swainson).—This exquisite little bird, more like a tropical sea-shell than a feathered songster, I met twice only in my rambles—once at this place, and again in the Colville valley; both were males, and in full nuptial plumage. From its extreme scarcity I am disposed to think it is only an occasional visitor to the eastern slopes of the Cascades, the ridge being its boundary northwards. The birds I obtained were shot in July.

LOUISIANA TANAGER (*Pyrranga ludoviciana*, Bonap.).—I never saw this bird west of the Cascade Mountains; it arrives here and at Colville in June. Male birds are first seen. On arriving, they perch on the tops of the highest pine-trees, and continually utter a low piercing chirp. Soon after they pair, and disappear into the forest. Where these birds build I cannot imagine; I have sought high and low for the nest, but never succeeded in finding it. I am inclined to think they must build on the tops of the very loftiest pine-trees; they leave again in September,

but never assemble in flocks. Its range is south through Oregon and California; how far north of Colville I had no means of finding out.

The Dusky and Franklin's Grouse are constant articles of daily food to us, being abundant throughout this district.

THE DUSKY GROUSE (*Tetrao obscurus*, Say—figured and described by Sir John Richardson, 'F. B. A.') is found principally on the western side of the Rocky Mountains. It arrives at Vancouver Island, at Nesqually, and along the banks of the Fraser river about the end of March and beginning of April. The male bird, on its first arrival, sits on the summit of a tall pine-tree, or on a rock, announcing his arrival by a kind of lovesong—a sort of booming noise repeated at short intervals, and so deceptive that I have often stood under the tree where the bird was perched, and imagined the sound some distance away. It is extremely difficult to see this bird when you know it is in the tree, so much does it resemble a knob or the end of a dead branch. Soon after their arrival they pair, but during the whole nesting-time the male continues the booming noise. The young are a good size in August, but never afford much sport, as they pitch in the trees immediately after being flushed.

Between the Cascades and Rocky Mountains this larger grouse seems to be replaced by, if not a distinct species, a very well-marked variety. In size it is a trifle smaller, but the great mark of distinction is the entire absence of the white band at the end of the tail. Finding, however, in some mature birds a trace of white, I hesitate as to making it a new species. The young nestlings, eggs, and mature male and female birds, from east of the Cascades, are in the British Museum, as well as others from the west or coast slope. In habits, periods of arrival and departure (or perhaps appearance and disappearance would be the more correct expressions), the two species or varieties are in every respect similar. Where they go during the winter I cannot imagine; the Indians say they go to sleep in the pine-trees. I do not think they migrate, but only retire into the very thickest trees, and, living on the fronds, pass the winter thus sheltered in the bush.

FRANKLIN'S GROUSE (*Tetrao franklinii*, Douglas).—I believe this bird is but rarely found west of the Cascades; but on the eastern side, and along the whole district lying between the Cascades and Rocky Mountains, it is tolerably abundant, always keeping in the mountains, often as high as

7,000 feet above the sea-level. It is the most stupid bird imaginable: when five or six are flushed together, they fly up into the nearest pine-tree, and there sit; throw sticks and stones at them, until you are tired, and they scorn to be frightened. I have often shot one or two in a tree where others were sitting, without their attempting to fly away. They remain in the deep woods and sheltered places during the winter, and feed on the leaves of the pine-tree. They begin nesting in May, and in proceeding from Colville to the Rocky Mountains I saw lots of chickens in June and July not long from the nest. I do not think these birds pair, in the strict sense of the word; but from the large number of females compared to males, I am disposed to think they are polygamists. I never succeeded in obtaining the eggs, but the mature birds and chickens are set up in the British Museum.

It may be as well to mention here the different woodpeckers common in the pine-forests, open timbered lands, and shrubby brush surrounding the lakes and prairies both east and west of the Cascades:—

HARRIS' WOODPECKER (*Picus harrisii*, Aud.).
—This woodpecker is by far the most abundant

species in the district. It is found on Vancouver Island, and along the entire course of the Boundary-line, south through Oregon and California, north to Fort Simpson: a few remain at Colville during the winter, but the greater number retire to the coast, and return in April and May. In May they pair, and bore out a hole in a dead tree; they use no lining for the nest, but lay the eggs on the bare wood. Their favourite haunt is on the stumps of trees growing round swamps or prairie-land.

GAIRDNER'S WOODPECKER (*Picus gairdneri*, Aud.).—The same remarks apply to this woodpecker as to the preceding, *Picus harrisii*. It differs slightly in habit, generally hunting for insects on the maples, alders, and stunted oaks rather than on the pine-trees. Specimens of both species were shot on Vancouver Island, Sumass prairie, Colville, and west slope of the Rocky Mountains, at an altitude of 7,000 feet above the sea-level.

WHITE-HEADED WOODPECKER (*Picus albolarvatus*, Baird).—The only place I ever saw this very rare bird was in the open timbered country about the Colville valley and Spokane river; why it should be confined to such a limited area I am somewhat at a loss to imagine, except it be that this woodpecker almost invariably haunts the

Pinus ponderosa, and never retires into the thick damp forest. It arrives in small numbers at Colville in April, and disappears again in October and November, or as soon as the snow begins to fall. Although I did not succeed in obtaining its eggs, I saw in the month of May a pair nesting in a hole bored in the branch of a very tall pine-tree (*Pinus ponderosa*). This bird seldom flies far, but darts from tree to tree with a short jerking flight, and always whilst flying utters a sharp, clear, chirping cry. The specimens sent home were shot in the Colville valley.

BLACK-BACKED THREE-TOED WOODPECKER (*Picoides arcticus*, Swainson).—I obtained this bird once only; it was on the summit of the Cascade Mountains. It was late in September, and getting cold; the bird was alone, and flying restlessly from tree to tree, but not searching for insects. Both when on the wing and when clinging against a tree, it continually utters a shrill plaintive cry. Its favourite tree appears to be the *Pinus contorta*, which grows at great altitudes. I do not think this woodpecker is found except on the hill-tops. In the valleys and lower plains it is replaced by the Banded Three-toed Woodpecker (*Picoides hirsutus*).

LOG COCK (*Hylatomus pileatus*, Baird.).—Not

often seen, and difficult to obtain from its shy habits, always hiding in the dark pine-forests, the silence of which is often broken by the tremendous noise this bird makes, rapping on the dead trees. It has a wide range—common east and west of the Cascades, and on the west slope of the Rocky Mountains; I have seen it north as far as Fort Rupert (Vancouver Island), and south through Oregon and California. Whether they migrate south I do not know, but I obtained them at Colville during the winter. Nests in May, generally in a tall dead pine-tree at a great height.

LEWIS' WOODPECKER (*Melanerpes torquatus*, Bonap.).—Not found, as far as I know, west of the Cascades, but is very abundant between the Cascades and the Rocky Mountains; it here frequents the open timber. Its habits and modes of flight are not the least like a woodpecker's; it flies with a heavy flapping motion, much like a jay, feeds a great deal on the ground, and chases insects on the wing like a shrike or king-bird. Whilst mating they assemble in large numbers, and keep up a continual loud chattering noise; they arrive at Colville in April, begin nesting in May, and leave again in October. The nest is in a hole in a dead pine-tree, usually

a great height from the ground ; the eggs brought home were obtained at Colville.

Striking in among the trees, and following on a trail for about a quarter of a mile from our log-house, I came suddenly on an open glade (or more aptly, perhaps, I may compare it to a meadow), such as one often stumbles on in Devonshire.

The grass was green, and peeping out in all directions were wild flowers of various species. A tiny stream, clear as crystal, twisted its way in many a bend and turn through this fairy spot. No human voice had ever, perhaps, disturbed the silence of this unusually solitary glen ; but the song and twitter of birds, and the buzz and hum of insect life, told at once that flower and tree were alike inhabited.

But there was one sound—song, perhaps, I may venture to call it—that was clearer, shriller, and more singularly tuneful than any other. It never appeared to cease, and it came from everywhere—from the tops of the trees, from the trembling leaves of the cottonwood, from the stunted underbrush, from the flowers, the grass, the rocks and boulders—nay, the very stream itself seemed vocal with hidden minstrels, all chaunting the same refrain. It was the first time I had heard this song in these wilds ; and although

I had not yet caught sight of the singer, I knew that it must be a cicada. I soon pounced upon the singular little vocalist, and captured him in his native orchestra. He was a handsome little fellow, with large bright shining eyes, wings like the most delicate lace, coloured green, like the leaves it loves to sit on, its body clothed in scales like fairy armour. It turned out to be an entirely new species, and now figures in the British Museum as *Cicada occidentalis*.

The genus *Cicada* is found in all the temperate and warm countries of the globe; some of them are nocturnal revellers, others, as our friend, singing only in the daytime. They were celebrated among the Greeks, who often kept them in cages for the sake of their song. They believed the cicadæ lived on dew, and regarded them as almost divine. It was the nightingale of the nymphs. Anacreon, hearing the cicada, says, 'The Muses love thee; Phæbus himself loves thee, and has given thee a shrill song; old age does not wear thee out; thou art wise, earthborn, musical, impassive, without blood; thou art almost a god!'

The Athenian ladies wore golden cicadæ in their hair, and it was used as the head-piece of the ancient harp. The following fable will, per-

haps, account for it: Eunomus and Ariston, two rival musicians, were contending against each other; each played the harp, and it was hard to say which was the better player, when 'crack' went one of the strings of Eunomus' harp. A cicada at once pitched on the top of the instrument and supplied the want of the broken string, and so effectually that Eunomus was declared the victor.

But the male Cicada has a shadow to cloud the bright sunshine of his happiness; a sad and sorry misfortune, I am afraid all my lady-readers will say, and I quite agree with them. The gentler sex, the Ladies Cicadæ, are all, without an exception, dumb. Some crabbed old Greek, evidently a bachelor or henpecked husband, has dared to say (I believe he was called Anaxagoras),

Happy the cicadas' lives
Since they have all voiceless wives!

Well, if she does not waste all her day in singing and scolding, she attends to her duty as a mother; and, whilst her idle husband carols his simple ballad, she is busy depositing hundreds of eggs in the branch of a tree.

Admirably adapted to its purpose is the ovipositor of the female cicada! A borer of the most

delicate structure, edged with a kind of saw or file-like apparatus, enables her to make a slit in the bark of a tree, into which the eggs are dropped. The eggs are white, somewhat oval, and quite flat, so as to pack neatly into the slit. The larva is an ugly little monster, with six legs, and a soft body of a dirty-yellow colour. Two years of his life are passed away in the earth, and the time arrives when the dark damp tunnels are to be abandoned; then from a creeping grub he changes into a winged denizen of the air, and with his voiceless mate spends a short but merry life, in ceaseless exultant jubilee.

That the cicada lives on dew is not by any means a poet's fancy. Having assumed the winged form, it loses the scissor-like mouth, that served its purpose admirably in the subterranean home for nipping up fine root-fibres, and has in its place a kind of sucker-like snout, with which it sucks up the juices of flowers and the sweet sap that exudes from the bark of trees. Happy as his life appears to be, he has many terrible enemies to encounter during the two months of his perfect existence. The brilliant oriole, in his gorgeous livery of orange-and-black, hunts for him under leaves and in the grass; and spying him out, nips him with its sharp beak, and descending

to the ground picks him to pieces, and, like a dainty epicure, swallows only the choicest bits; the Louisiana tanager, flashing like a gem in the golden sunshine, seizes on him and gobbles him up bodily; crafty woodpeckers and stealthy prying little flycatchers pounce upon him in the midst of his song, and end his life ere yet it has well begun. It shows us how wise is Creative Wisdom in endowing these harmless little insects with such vast powers of reproduction! If one female only succeeds in safely depositing her eggs, at least seven hundred larvæ are produced; and may it not be that, being voiceless, she is less likely to be discovered than the male?

The structure of the apparatus with which the male executes their long-continued, shrill, monotonous music is most singular, and well worth investigation. It is a sort of compound instrument, between a banjo and a violin, consisting of two membranes tightly stretched, and acted on by powerful muscles; the sound issues from two holes near the insertion of the hind-legs. The intensity of the sound produced varies in different species, dependant in a great measure on the size of the instrument. One species, found in Surinam, produces such ringing tones from his musical apparatus, as to be distinctly heard at a

mile distance—hence he has obtained the name of ‘the harper’ (*lierman*). Virgil says the Italian cicadæ burst the very shrubs with the noise they make:—

Et cantu querulæ rumpent arbusta cicadæ.

I was curious to watch the female depositing her eggs. She first clasps the branch both sides with her legs, and with the end of the file very carefully slits up the bark; then, placing the instrument longitudinally, files away until she has obtained sufficient length and breadth. The *small* teeth of the files are now used crosswise of this fissure, until a trench is made in the soft pith. When large enough, slowly down the groove in the centre of the instrument glides a small pearly egg, pointed at both ends, and so transparent that the little grub within is easily discernible. Gently she lays it within its bed, and then drops a thin gummy material on it, to secure it from moisture. This finished, she proceeds to deposit another, and so on, until a sufficient number are produced to fill the fissure; then over all she drags the everted bark. It is easy to perceive where the cicada has been concealing her brood, by the elevation on the branch. In this manner she deposits about seven hundred eggs, going from

branch to branch, her marvellous instinct teaching her to select the most suitable wood for the purpose. The time occupied in constructing each nest was from fifteen to twenty minutes. Her earthly mission finished, she drops, fainting and exhausted, from the branch, and dies.

The male, who is always trilling his refrain, goes on indifferent, or unconscious, that the task of his faithful spouse is finished, singing ever, until his time comes—then he, too, drops beside her. Thus the songs, one by one, cease—not only the cicada's, but all the forest choir—and give place to the winter blasts, that sigh in mournful music through the leafless trees. These winds tear from the trees the decaying branches, which the instinct of the insect proclaimed were dying months previously. From the nests that are in these fallen branches, it is easy for the grub, the larva of the cicada, to bury itself in the earth, its future home; but those that come out whilst the branch remains on the tree, have to make a perilous descent. Fifty to sixty days from the time the eggs were deposited, there emerged an ugly little yellowish grub, covered with soft hair, lively and bustling; with pinkish eyes, and with feet armed with claws; if on the tree, they rushed directly to the end of the branch, and, without

any apparent fear, precipitated themselves recklessly to the ground, where, without loss of time, they commenced digging. Their forelegs, shaped somewhat after the fashion of a mole's, enable them to turn up the ground with great expedition, ten to twelve seconds being long enough for one to get entirely out of sight. How long they remain in the larvæ condition I am unable to say.

An Athenian banquet, without an *entrée* of cicadas, was deemed as great a failure as would be, in these days, a Greenwich feast without whitebait. The larvæ and pupæ were esteemed the greater dainties, but a female full of eggs, artistically browned, and served up hot and juicy, was a *bonne-bouche* the Greek epicure well knew how to estimate. Even Aristotle thought the dish a luscious one, '*quo tempore gusta suavissima sunt*,' and at the present time cicadæ are regularly sold in the markets of South America. The legs and wings are stripped off, and the body of the insect slowly dried in the sun. When sufficiently dry, it is powdered, and made into a kind of cake, and in that form sold and eaten.

CHAPTER IX.

FROM SYNIAKWATEEN TO THE PACK RIVER—FROM PACK RIVER TO THE KOOTANIE—THE TOBACCO PLAINS—HUDSON'S BAY COMPANY'S TRADING-POST—THE KOOTANIE INDIANS—A KOOTANIE CANOE—THE GALTON RANGE AND FLATHEAD RIVER—THE MOOSE DEER—WAPITI OR OREGON ELK—CARIBOU—VIRGINIAN DEER—WHITE-TAILED DEER—BLACK-TAILED DEER—MULE DEER—THE ASCENT OF THE ROCKY MOUNTAINS—CAMP IN THE GLEN—YELLOW-HAIRED PORCUPINE—SAY'S STRIPED SQUIRREL—PINUS CONTORTA—ROCK PTARMIGAN—THE MOUNTAIN GOAT—THE BIGHORN AND ROCK-WHISTLER.

LEAVING Syniakwateen, the trail runs through twenty-five miles of dark, gloomy, grassless forest, until reaching the Pack river, a small stream, except in the flood-time: from this river to the Kootanie, the trees are less thickly clustered.

In the Kootanie valley there is an abundance of grass; we crossed the river at its south-eastern bend, to reach the Tobaccoplains, a gravelly waste, the grass on it at this time (July) completely dried into hay by the sun. A small trading-post of the Hudson's Bay Company stands near the crossing, occupied by one trader, who obtains the

peltries' undressed skins, trapped by the Kootanie Indians, a fine tribe owning large herds of cattle and a great number of horses.

All the savages I saw wore small brass crosses suspended from their necks, and invariably made the sign of the cross on their breasts when they shook hands. Two Romish priests have been long resident in the Flathead country; these indefatigable men pay regular visits to the Kootanies, and from their teachings these outward signs of Christianity have been learned.

Their canoes are of a most singular shape, not unlike the Kallispellem canoe shown in the illustration of Syniakwateen. They are made of a large sheet of bark, stripped from the spruce-fir, which is tightly sewn at both ends, but sloped to form a conical point. The length of the bottom of the one I measured was 12 feet, the width between the gunwales only $7\frac{1}{2}$ feet; the bark is supported on ribs of split wood, and gummed where there are any holes or weak places.

When an Indian paddles it, he sits at the extreme end, and thus sinks the conical point, which serves to steady the canoe like a fish's tail, while the other is raised clear above the surface. They are more easily upset than any

canoe I was ever in, but with skilled hands carry a fair-sized load, and pass rapidly over rather than through the water.

The altitude of the Kootanie pass above the sea-level is about 2,100 feet. Crossing the lower corner of this immense valley, our trail led up to the Galton Mountains, a massive range dividing the Kootanie and Flat-head rivers, and attaining an altitude of quite 8,000 feet above the sea-level. These mountains afford on their slopes admirable pasturage for horses and ruminants, being the favourite hunting-grounds of the Kootanies west of the Rocky Mountains.

I may mention, incidentally, that buffalos never pass from the east to the west side of the Rocky Mountains; hence the Kootanies cross the Kootanie pass every summer to hunt on the plains east of the mountains, for buffalo-meat, and their skins called robes. This will be the best place to briefly describe the different species of deer I saw in British Columbia, or in Washington Territory, immediately adjoining it; most of them, if not all, are to be found in the Kootanie country.

THE MOOSE (*Alce americanus*, Jardine).—I never obtained a specimen, neither did I ever see the moose-deer on the west side of the

Rocky Mountains, but on a trail that leads over a sandy waste, just before descending into the valley of the Flathead river, I picked up several shed moose-antlers; this was about 4,000 feet above the sea. Traders of the Hudson's Bay Company and Indians have also told me that moose are frequently killed on the western slope of the Rocky Mountains. I feel quite sure that the moose still inhabits the Galton range of mountains, and would be also found, if properly sought for, in the open timbered land at the base of the western slope of the Rocky Mountains.

The district is well adapted to the habits of the moose: the ground irregular, and covered with an open forest-growth, in the hollows forms mossy swamps, in which grows an abundance of willow, the young shoots of which constitute the favourite food of the moose. A moose-hunter is ever watchful for cropped willow-branches or morsels of partially-chewed food, dropped as the animal walked along. A moose always walks on the very points of its toes, so that its track is in dots arranged in pairs, at a distance of three to four feet from each other. If the ground is very soft, the foot-prints are more like those of a wapiti, but a practised eye can tell the difference at a glance.

As a rule, a hunter never follows directly on

the track of a moose; before it lies down, or stops to feed, it invariably doubles back on its own tracks, after going for some distance against the wind, so that anyone following would taint the wind, and in all probability pass the animal's hiding-place. Coming on the trail of a moose that has not been disturbed, the hunter makes a circuit, to cross the track some distance ahead: if he has a keen eye, he readily detects the dots as he crosses them at right-angles. If he does not find the tracks, he concludes the moose has doubled back; by another circuit he returns to the track, and works up cautiously against the wind, until he discovers the hiding-place of the moose. Great care, and long practice too, is needed to enable a hunter to wind his way like a snake through the bushes, without cracking the dead branches. The flap of its great ear generally betrays the moose; large as the animal is, a hunter's practised eye can alone make it out when ensconced in its lair.

The top of the antlers and flapping of the ears are usually the only guides to determine the position of the body: the spot to aim at fixed on in the hunter's mind, he fires into the bushes; then follows a crash, as the animal either falls, mortally hit, or dashes away through the crackling

timber. It is seldom an experienced hunter ventures to risk a shot when stalking, until within twenty yards of the moose.

AMERICAN ELK* or WAPITI (*Cervus canadensis*, Exl.).—This magnificent deer has a greater range, and is more widely and generally distributed, than any other deer in North-western America. It is found along the entire coast range from California to Sitka, on Vancouver Island, and on several of the islands in the Gulf of Georgia, on the east and west slopes of the Cascade Mountains, on the western slope of the Rocky Mountains, reaching an altitude in summer of 7,000 feet above the sea. I saw herds of these elks in the Klamath district; they grow to a large size in these rich pastures, attaining a weight of from 500 to 700 pounds. The antlers are enormous in the adult animal, measuring six feet from tip to tip, and eleven inches in circumference above the burr. I scarcely think there are sufficient grounds for making this Oregon Elk a distinct species; it seems to me to be a well-marked variety only of the wapiti common to the eastern side of the Rocky Mountains. The wapiti on the Oregon

* I use the term *Elk*, for the Wapiti, in its local sense. Strictly, it applies only to the Moose.

coast grows much larger, and differs in colour from the animal found on the inland mountains; but climatal differences are quite sufficient to account for it. The habits of the wapiti are too well known to need any description.

WOODLAND CARIBOU REINDEER (*Rangifer Caribou*, Aud. and Bach.).—The Caribou inhabits the high ridges of the Cascade Mountains, the Galton range, and western slope of the Rocky Mountains. I have no positive proof of its existence north of the Fraser, but I think there can be but little doubt, if any, that its range is through the entire mountain district, extending into Russian America.

VIRGINIAN DEER (*Cervus Virginianus*, Bodd);
WHITE-TAILED DEER (*Cervus leucurus*, Douglas).

—Whether these are really distinct species I cannot say, but the small grey deer so common on the plains about Nesqually and in the timber belting the Sumass prairies, I believe to be *Cervus leucurus*. I obtained two specimens on the Diamond Tree pass, a high mountain ridge ascending sharply up from the Sumass prairie, in December—one a young male, the other a doe heavy in fawn—and have no doubt about their being the above species. I have also seen this deer on Vancouver Island, and in the Kootanie region.

BLACK-TAILED DEER (*Cervus Columbianus*, Richd.).—This deer has by far the widest range, and is more numerous than any other species of the smaller deer. It is found on Vancouver Island, on a great many of the islands in the Gulf of Georgia, on the plains of Nesqually, eastern and western slopes of the Cascades, and through the entire district intervening between the Cascades and the Rocky Mountains; south it extends through Oregon into California. I saw herds of them on the Klamath plains.

The Sumass Indians had a very ingenious mode of coaxing the male within shot during the hunting season. They make a call or whistle from the hollow stalk of a water-plant, and hiding in the bush imitate the cry of the doe; by this artifice they entice the male to come close to them. Their favourite resort seems to be in the timber, about open plains, prairies, and on high ground, during the summer months, but descend for shelter and protection into the valleys on the approach of winter and snow. Their fawns are dropped in May, two being by no means unusual.

MULE DEER (*Cervus macrotus*, Say).—I am far from sure as to the existence of this curious deer west of the Cascades, neither do I think it is at all plentiful on the eastern side. The speci-

mens brought home were obtained at Colville during the winter months; I also saw other very fine specimens in the possession of two Indians, in the Shimilkameen valley. It is found on the Spokane plains, and in the adjoining forests, on the Tobacco plains in the Kootanie district, and on the slopes of the Galton range of hills.

The trail follows the eastern slope of the Galton mountains to the Flathead river, a good-sized stream. The Flathead valley is about 4,005 feet above the sea-level, sandy and thinly timbered; such vegetation as there is, evidences a particularly dry climate. From this valley, after fording the stream, the ascent of the Rocky Mountains commences, a gradual incline through rather thick timber for some distance; then over a steep hill 6,970 feet above the sea, to descend its eastern slope and reach a glen. Wild and beautiful is the scenery on every side: right and left stupendous pinnacle-like hills, white with snow, seem to reach to the clouds; ridge follows ridge, each seeming to be more craggy and massive than its fellow, as far as the eye can scan this wondrous landscape. Aptly has this great central axis of elevation been named the Rocky Mountains; one is puzzled to imagine how such masses of rock could have been up-

heaved to so great an altitude. The main trail from this glen leads over the Kootanie pass to the Buffalo plains of the Saskatchewan; our trail to the astronomical station, near the 49th parallel, 6,480 feet above the sea-level; above this nearly 6,000 feet more altitude could be gained by climbing.

Whilst at our camp in the glen I obtained two rather rare animals, one—

THE YELLOW-HAIRED PORCUPINE (*Erethizon epixanthus*, Brandt).—A quaint-looking beast, that may be seen in the Porcupine Case in the British Museum; the quills are entirely hidden by a long silky coat of yellowish-hair. Of its habits I know very little; living entirely in the dense forests, watching it is an impossibility. It feeds on the bark and succulent shoots of the shrubs and trees composing the underbrush: for nipping these off the jaws they are armed with four powerful incisor-teeth, sharp as chisels.

SAY'S STRIPED SQUIRREL (*Spermophilus lateralis*) is one of the most beautiful of the Spermophiles ('seed lovers.') Its size is about that of the ordinary red squirrel. Instead of the quiet sombre garb usually worn by its brethren, this little squirrel is clad in the gayest costume imaginable; and as it nimbly

skips from rock to rock, or darts along a fallen tree, the stripes assume a ribbon-like appearance, unlike any animal's coat I ever saw.

Two broad stripes of jet-black mark each side of the animal, and extend from the shoulders to the thighs; between each pair of stripes is a line of equal width, of a yellowish-white. The medium region of the back is a rich grey; chestnut-brown, mottled with yellow and black, colours half the thighs, and extends over the hips, shading away into the grey on the back. The tail is rather short, but very brushy; the under-surface, coloured a bright yellow-brown, is margined with a much lighter tint of the same colour. Above the tail is grey, like the back. Length about seven inches; tail four inches without the terminating hairs.

It feeds principally on young grass and the juicy stalks of succulent plants; extending from the holes or clefts where they reside, trails beaten like footpaths lead in the direction of the favourite herbage. It is a most active and watchful squirrel: at the slightest noise it bounds with astonishing speed, and takes leaps almost equal to those of the flying-squirrel to reach its hole, uttering as it runs a low plaintive whistle. Conspicuous as this squirrel's coloration appears when viewed apart from its habitat, nevertheless, it

admirably accords with the light and dark markings peculiar to the slaty rocks amidst which I saw it; when the animal is perfectly still, it is quite impossible to make it out to be other than a portion of the rock, until by moving it betrays itself.

The most conspicuous pine in these elevated districts is the *Pinus contorta*. It thrives at an altitude of 7,000 feet above the sea-level. Where there are Indians the young trees of this species are invariably stripped of their bark to a height of seven feet from the ground, or as high up the trunk as an ordinary person can reach. This is done in order to procure the inner bark, which the savages use as food; they eat it in the fresh state as peeled from the tree, and compressed into cakes, in which state it can be preserved for a long time, and is easily carried.

The Summit Camp is placed in a snug nook under a massive slaty kind of mountain; there is little to be seen from it save rugged hilltops and snow. Near the terminal point of the Boundary-line is the watershed, and it is hardly an exaggeration to say one may sit and smoke his pipe with one foot in the water that finds its way into the Atlantic, whilst the other is bathed in that flowing into the Pacific.

THE ROCK PTARMIGAN (*Lagopus rupestris*) and a few smaller birds, were the only members of the feathered tribes I saw. The ptarmigan had their chickens with them; the parents and young grouse may be seen in the British Museum, obtained at this camp.

THE MOUNTAIN GOAT, which is in reality nearer an antelope (*Aplocerus montanus*, Grd.), is a most conspicuous feature amidst this rocky desolation. Gazing on some unusually splintered and contorted hillside, suddenly a small herd of mountain-goats come, as if by magic, round a jutting corner, and deliberately march along on a ledge, where, to all appearance, a cat would be puzzled to find a firm foothold; frighten them and they gallop with equal safety, and, springing from one side of a chasm to another, pitch like a bird, rather than a hard-hoofed fourfooted beast, on the narrowest ledges. The females had kids (or fawns, perhaps is more correct) by their sides. I ate some of the flesh, but its flavour was goaty in the extreme.

THE BIGHORN or MOUNTAIN SHEEP (*Ovis montana*, Cuvier) is also a tenant of the lower ridges of these mountains. I did not see any, but the Indians say they often kill them. The

bighorn is also found on the middle and upper ridges of the Cascades.

THE HOARY MARMOT (*Arctomys okanaganus*), or, as styled by the fur-traders, the 'Rock Whistler,' lives on the very summit of the Rocky Mountains.

If there is a spot on the face of the globe more dismal, solitary, inhospitable, and uninviting than another, that spot is where this most accomplished siffleur resides; and it is not by any means a matter to be wondered at, that so very little is to be found, in works on Natural History, relating to this little anchorite's habits.

My purpose being to climb the craggy ascent that led up to the watershed—not by any means a dangerous thing to do; it was simply leg-aching, tiresome, scrambling work. The grass being dry, it polished the soles of my mocassins, until they became like burnished metal; so that progression, up the long green slopes, was much the same as it would have been up an ice-slant, with skates on. I got up at last, and, feeling somewhat fagged, seated myself on a flat rock, unslung my gun, lighted my pipe, and had a good look at everything round about me.

The sun had crept steadily up unto the clear sky, unflecked by a single cloud; the mists, that

in the early morning hung about the ravines, and partially veiled the peaks and angles of the vast piles of rocks, had vanished, revealing them in all their immensity. Below me was a lake, smooth as a mirror, but the dark-green cold look of the water hinted at unfathomable depth. Tiny rivulets, fed by the snow, wound their way, like threads of silver, between the rocks and through the grass, to reach the lake

I was not so much impressed with the beauty of the landscape, as awed by its substantial magnificence. Few living things were to be seen save a group of ptarmigan, sunning themselves on a ledge of rocks, a couple of mountain-goats browsing by the lake, and a few grey-crowned linnets,—birds seldom seen but at great altitudes. There were also the recent traces of a grizzly, or black bear, that had been munching down the wild angelica. A solemn stillness intensified the slightest sound to a supernatural loudness—even a loosened stone rattling down the hillside made me start; there was no buzz and hum of busy insects, or chirp of birds, or splash of torrents, to break the silence; the very wind seemed afraid to moan: it was deathlike silence to the very letter.

As I smoked away, silent as all about me, sud-

denly a sharp clear whistle, that awoke the echoes far and near, thoroughly roused me, and sent all other thoughts to the rout. As I could see nothing, I deemed it expedient to remain quiet. Cocking my rifle, I lay on the grass, and waited patiently for a repetition of the performance. I had not long to tax my patience: again came the same sound, then others joined in the refrain, until the place, instead of being steeped in silence, resembled the gallery of a theatre on boxing-night.

I very soon spied one of the performers, seated on the top of a large rock; its position was that of a dog when begging. With his forefeet he was busy cleaning his whiskers, smoothing his fur, and clearly going in for a somewhat elaborate toilet: perhaps he was going a wooing, or to a morning concert, or for a constitutional, or a lounge on the 'Marmot's mile;' but whatever his intentions were, I regret to say they were frustrated. Solely in the cause of science I had to stop him; resting my rifle on a flat rock, as I lay on the ground, I fired, and the sharp crack, as it rang amid the rocks, was the whistler's death-knell.

Rapidly reloading, I scampered off to secure my prize. I am afraid there was not much pity felt—delight at getting a new animal was uppermost.

Smoothing his fur, I plugged the shot-holes, examined him closely, measured him; admired his handsome shape, bright-grey coat, and brushy tail; investigated his teeth and claws, walked back, and had a look at him from a distance; then set to work, and skinned him. You can see him also, if you like to visit the British Museum, where this very victim is 'set up,' and placed amidst the Marmots; his name, together with that of his destroyer, black-lettered on the board to which he is affixed. At the sound of the rifle, every one of his companions took sensation-headers into their holes, and did not come out again during my stay on this occasion.

The length, from the nose to the root of the tail, was a trifle over twelve inches; the tail six inches; head oval, and very flat; nose, short and broad, thickly covered with fine hairs; the cutting (incisor) teeth large, strong, and of a yellow colour; whiskers, black and long; ears, nearly hid by the fur on the neck and vertex; the claws, strong and curved, are admirable digging implements. The general tint is that of a rusty-grey, with a blackish conspicuous band extending from the back of the head down the shoulders. I need not give a more minute detail of specific characters.

In habits marmots are essentially sociable animals, inasmuch as they live in little colonies; but, unlike some of the prairie marmots, these rock-whistlers, when married, have a house of their own; and if blessed with a family—a blessing seldom denied them—they kick out the youthful pledges of affection as soon as they can nibble up a living for themselves. The burrow, which is quite two feet in diameter, is dug invariably in a slanting direction, generally at the base of a rock, standing up like a pedestal, on which they love to sit and whistle. Wide trails, bare-like roads, lead in all directions from their holes to the feeding and drinking-places; their hours of repast, sensibly chosen, are early in the morning, when the grass and herbage is wet with dew.

For only a few months, during summer, is this quaint little miner permitted to revel in the luxury of light; for seven dreary months out of the twelve does he sleep out his drowsy existence. What a wise and wonderful provision, to secure from utter extinction animals compelled to live in these icy regions, is hybernation! Growing wondrously fat during the summer, they retire, when the nipping cold and deep snow comes, into burrows lined with soft warm bedding; there become semi-torpid, and literally a

living stove; for the fuel, stored as fat, is slowly burned up in the lungs, giving out heat just as coal would in a fire-grate. Thus the rock-whistler heeds not the chilly blasts that sweep through gorge and glen, and so sleeps on safe from harm, until Sol comes to set him free.

The Redskin is the whistler's most implacable enemy; he never tires of hunting and trapping the little animal, delighting to use his jacket in the fabrication of rugs. The hair being thick, the marmot-robe keeps out both wet and cold, and stands an immense amount of wear and rough usage. Much as the savage likes the coat of his captive, he likes his carcase even better. When skinned a long peeled stick is thrust through the body, from tail to head; then placed slantwise, one end being fast in the ground, the treasured morsel is slowly roasted over a gentle fire.

I can bear testimony to the delicacy of roasted marmot; it beats Ostend rabbit hollow; all honour to the redskin's taste! A dinner off a roasted rock-whistler, washed down with a pull at the crystal stream, is a repast not to be despised.

It would prove of little interest to the reader to go again over the ground we have, I trust, travelled pleasantly together. The Boundary line

was completed too late to return that same year, so another dreary winter was spent at Colville: the cold was so intense that the ink froze in the pens, even when it was kept hot before the fire, and thus put a stop to all writing; the steam rising from the teacups would freeze into a kind of sleet, and fall again on the table. Still, in spite of this intense cold, if the air was still, as it usually happened to be, no inconvenience was felt, and we all wandered about with but little if any warmer clothing than we wore at Vancouver Island.

Whilst we remain here, I may as well give a brief account of packing, camping, and provisioning, and the general features of the Boundary line, as well as the natives and their dogs.

CHAPTER X.

CAMPING—PACKING—PROVISIONING—THE BOUNDARY TOUR.

To know how, when, and where to camp, and to be practically familiar with the systems of transport, necessitated in a country where roads, wheels, and 'iron horses' are unknown, forms by no means the least valuable part of a traveller's experience. Twelve years of constant practice in 'the art of travel,' spent in various parts of the world, has taught me very many useful lessons, that may be, possibly, valuable to those who intend devoting a portion (be it large or small) of their lives to wandering through uncivilised regions.

A tent should always form part of a traveller's equipment, if possible (my remarks apply more particularly to North-western America). Camping out is all very well, 'sleeping with no other canopy than the blue expanse' sounds very romantic and pretty, and generally 'lionises' the individual on his return who has done it; but no

one with a grain of experience would voluntarily sleep in the open air, if a tent was procurable. 'If you can't do what you like you must do what you can;' in the absence of canvas, a sky roof is about the only alternative.

Assuming a tent is available, the kind of tent I should strongly recommend is a 'gable end' or 'dog-kennel' *twelve-ell* tent, with a seven-foot ridge-pole, and two six-feet upright poles. The three poles should be joined in the centre with strong galvanised iron ferrules, so that they can be put together like a fishing-rod. One man, unaided, can with very little practice pitch such a tent in from eight to ten minutes, and peg it down.

Let me advise all travellers to carry their poles with them; trusting to the chance of cutting them is a bad plan, causing delay in pitching the tent. Poles are not always so very easy to find as the inexperienced may imagine, although travelling in the very midst of a forest; more than this, a tent is never so secure as when pitched with poles made on purpose. It is always better, too, to carry tent-pegs than trusting to cut them at the camping-ground; barrel-staves afford capital material for pegs.

Bedding.—A small horsehair mattress, three feet six inches wide, and six feet long. Two

blankets, a buffalo-skin, and waterproof wrapper to spread on the ground, and roll the bedding in when travelling, can be easily carried with a tent, and will be found very pleasant to sleep on at night or lounge on in the day. Great care should be exercised in packing up the bedding. Mules and horses often get a swim, or fall in fording streams, and rain frequently drenches one when least expected. If well rolled the bed should be impervious to water, and therefore safe against any accident from wet; finding soaked bedding on camping is enough to try the temper of a saint.

Tools.—An American axe and a three-inch auger are the only tools a skilled hand needs; with them he can build a log-house, or roof it, and add fireplace, chimney, door, and window; he can also make a raft, build a bridge, or hollow a cedar-log into a safe and shapely canoe. A strong case-knife, such as pork-butchers use, is by far the best kind of knife for general purposes. Worn at the belt, it is useful for everything, from mending a pen to skinning a buffalo or a humming-bird.

Cooking Utensils.—A frying-pan, small wooden pail, and tin pannikin. The former is equal to any emergency, for baking or frying; the

cup to boil coffee, make tea in, and drink from; the pail to dip water, and keep near the camp-fire ready for any purpose. A pail is also very useful to give your animals a drink, when the water is inaccessible to them from mire or rocky cañons.

Spare cloths should be carried in a round waterproof bag, made of strong canvas, painted (such as sailors use), in which notebooks and writing gear can be also stowed away.

For clothing I give the preference to good Scotch tweed, as a material better suited to stand wear-and-tear, and supply warmth without weight, than any fabric I have ever tried. Fur I abominate, as having no quality that is not immeasurably improved in a woollen fabric. Leather for jacket or trousers avoid as you would a rattle-snake, if you can by any possibility obtain other material. It shrinks when wet, shrinks when dry, feels cold at all times, and requires a week to dry if thoroughly soaked—a process that contracts the sleeves, if a jacket, from the wrist to the elbow, and trousers to knee-breeches.

Strong 'lace-up' boots, if you are provident enough to bring out a stock, are far and away the best foot-armature. Mocassins are only to be

tolerated in the absence of regular shoes and boots; they are as pervious to water as brown paper, and but scant protection against prickles and sharp stones. 'Skin-shoes' do very well for redskins, whose feet are as hard and tough as a saddle-flap; but take advice, and never forget a good supply of strong 'lace-ups' and a limp accommodating 'wide-awake.'

Firearms may be left entirely to the choice of the traveller: every man has his fancy weapon, and is ready at all times to do battle in support of its merits. To my taste a strong No. 12 double gun, smooth bore and to load at the muzzle, is by far the most useful gun for general purposes. Were I to enter into the respective merits of muzzle-loaders versus breech-loaders, the smooth-bore versus the rifle, I should only repeat what has been time after time discussed by the most able and experienced sportsmen. The choice of firearms I leave to my readers' tastes and inclinations.

Fishhooks of different sizes, gut, silk, and a piece of cobbler's wax, are absolute essentials; if you are angler sufficient to tie your own flies, fur and feathers are always obtainable. It saves a host of bother, to quietly sit down by the river-bank or camp-fire, and manufacture any insect

monstrosity you may deem most likely to 'kill.' Failing this useful accomplishment, take an assortment of flies with you; strong, rough, gaudy fellows I have always found most effective. Hair-line is best, if you are lucky enough to possess it, but stout cord will answer every purpose. Winch and rod are luxuries I always dispense with when travelling. I cut a stick to serve my purpose, and tie my line to the end of it; wind round the surplus length, fasten with a couple of half-hitches, and flog-away; if by chance a fish is hooked, too large to risk jerking out, play him as best you can, and leave the rest to luck and the strength of the tackle. A line equipped for immediate use I always wear twisted round my hat. In coming to a stream that looks enticing, I tether my horse, cut a rod, tie on my line, and go to work. If success rewards my efforts, I catch as many fish as may be needed, string them up, and wait for camping-time to devour my share.

As the *equipment* of mules and horses, provisioning, and systems of transport apply with equal force to many as to a solitary individual, it will save repetition, and answer every purpose, to describe the means we adopted in marking the Boundary line. Packing one or fifty mules re-

quires, in the packer or packers, an equal amount of skill.

As I have already said, a bell-mare is absolutely indispensable to a train of mules. A single mule can be tethered to graze; a train must be turned loose, and kept if possible from wandering by the bell-mare, which must be either tethered or hobbled. More than this, unless the train voluntarily followed the bell, no power on earth could drive them a yard when loaded. Pigs are models of passive obedience compared with mules; mules never, by any remote contingency, do right except by accident. The bearer of tea, tobacco, bedding, instruments (anything, in fact, spoilable) is pretty sure, if he has a chance, to fall or purposely roll in any water through which his route lies. Nine chances to one, when an early start is determined on, two or three mules are absent; and after hours of search and delay, the irate packers suddenly pounce upon them, or they come strolling back, whisking their tails and braying for the bell, having been quietly snoozing or designedly hid in the bushes or sedge-plants close to the camp the whole time.

We had one small 'pinto' (spotted) mule, very good if anyone could only get on his back, and sit on it after getting there; when packed, his duty

was usually to carry the tent-poles. I am sure he knew, when thus armed, that mischief was in his power: no sooner was he loosed from the packers than he charged in amongst the thickest clump of mules he could see, running the sharp ends of the sticks into their sides, and sending the band right and left—paying off old grievances, I imagine. Colonel Hawkins (Her Majesty's Commissioner) once saw him turn a complete summersault, when the aparacjo was first synched on. With all their faults we could not do without them, and had patiently to put up with their oddities.

Pack-saddles of all sorts and patterns, that have any element of woodwork in their construction, I decry as worse than useless. The frame broken, your pack-saddle is done for; no mending will ever make it fit for use. It will work unsteadily on the animal's back; the load easily shifts, and a gall is the consequence that may take months to heal. We had a few 'crosstree' pack-saddles, made to begin with on the most approved plan and of the strongest materials, but abandoned them for the aparacjo, a Mexican invention, which I believe to be the very best contrivance ever made for packing freight of various kinds for transport on mule-back.

It requires a great deal of skill and long prac-

tice to pack and lash goods properly on to an aparacjo; but, believe me, the knowledge to a traveller is worth all the time and trouble it takes to acquire.

The great thing to accomplish in the construction of a pack-saddle is to avoid the use of wood, buckles, fixed lining, and stitching where any strain is required. An aparacjo is simply two large leather bags fastened together at the top: sew two bed-pillows together by the ends, stuff them tightly with hay, hang them across the back of a dog (or a chair will do), fasten them firmly with a wide canvas girth, imagine them to be made of strong leather, and you have an extemporised aparacjo before you.

The 'rigging' for a mule consists of—1. The Aparacjo, which varies in size from five feet in height or length to three feet six inches, the width being about two to two-and-a-half feet, the weight of an average-sized one being from thirty-six to forty pounds when dry, of course much heavier when wet. The value in California is about fifty dollars (10%). 2. The Synch—which is a wide canvas girth with a leather strap at the end, that runs through a wooden eye or iron ring—should be one foot six inches wide, and about twenty feet long; its use is to fasten on the aparacjo.

3. The Sling rope, made of cord about the size of clothes-line, twenty to thirty feet long, according to the material to be packed; its use is to sling various packages, or casks, or boxes, in readiness for lashing. 4. The Riata, a strong rope sixty feet long, with which everything is securely lashed; by an intricate but admirable arrangement, this long rope, that has neither loop nor knot, so fastens the load that a mule rolling down a hillside can hardly displace it, a thing I have seen happen more than once. 5. The Sweat-cloth, a piece of canvas about four feet square, that goes next the skin. 6. The Blankets, four or five pieces, a little larger than the sweat-cloth. 7. The Corona, an embroidered cloth that goes between the aparacjo and blankets.

The packers know by the patterns embroidered on it to which mule the aparajos belong. A blinder, to drop over the mule's eyes whilst being saddled and packed, always carried by each packer, also serves as a formidable whip, of which the mules have a wholesome dread; laggards in a train, unruly and careless 'mulos,' get switchings with the blinder they do not readily forget. A halter completes the equipment (technically styled 'the rigging') of a pack-mule. Each packer has a riding-mule; the cook always rides

the bell-mare in front of the train. Two packers to every six mules is a fair division of work.

Imagine a camp chosen with due regard to the three primary requisites—wood, water, and grass: breakfast over, bedding rolled up, tents struck and packed in the tent-bag, and the tinkling bell heralds the approach of the mules, being driven in by the packer whose duty it is to 'herd' them. Fifty come trotting in; the packers, blinders in hand, await their arrival, standing by the aparajos, that are placed side by side in a kind of half-circle. The bell-mare seized on first, is haltered, and tied to the first aparajo; then the mules file up, each standing with its head over an aparajo; it sometimes happens to be the one it carries, mere matter of accident, not the choice of the mule on the score of ownership; they are not half so clever as that. The halters are then put on from the opposite side of the aparajo, and each fastened to that of its neighbour. This saves counting; if the halters are all used, the mules are there to wear them.

Saddling begins immediately after haltering. Two packers loose a mule from its neighbour, find the aparajo belonging to it, slip the blind over its eyes, adjust the saddle-cloths, *fling* on the aparajo, and then 'synch up.' First one

packer, placing his foot against the poor animal to get the greater purchase, hauls with all his might, until one would fancy mule endurance had been taxed to its utmost limits. Not so, however: the other packer, who has been on the off-side steadying the *aparacjo*, now comes to aid his comrade; each this time places a foot against the mule's ribs, and, by their united efforts, nearly convert the beast into the shape of a dragon-fly; the lynch fast, the blind is slipped off and the mule turned loose to grunt, kick, plunge and roll, as best suits its temper.

When all are saddled, packing commences. The 'freight' is all piled in loads; under each load lays the *riata* or long lashing cord, on the load the sling-rope. To describe the manner of 'putting on' a load, and properly lashing it when on, is impossible. A month's daily practice is insufficient to make an apt scholar a moderately good packer. One may watch the mode of fastening the load with a *riata* for a year twice a day, and be no more able to do it at the twelve months' end than the flute could be learned by looking at another blow and finger it. Hence written description would be useless.

Packs adjusted, the *cook* starts on the bellmare, the mules being carefully counted as they

string one by one after her. The packers, mounted, ride like field officers up and down the line of marching mules. When a pack slips, the mule is at once caught and the disarrangement readjusted. Extreme vigilance is needed whilst a train is on the march, lest a shifted load, or loosened lynch, causes a gall on the back of the mule; a half hour's negligence in this respect may render an animal useless for three or four months.

In provisioning the men employed on the line flour was found to be far better than hard bread, more portable, less liable to injury, and better relished than biscuit. Our men learned to bake capital bread, small iron ovens being part of each working parties' equipment. Baking-powder was also served out as part of the rations.

Salt pork and ration beef were carried in 100lb. barrels, two barrels being a load for a light mule, or four fifty-pound sacks of flour. Two hundred and fifty pounds may be taken as a fair average load per animal for a train of mules.

Feeding the mules west of the Cascades was a most expensive and difficult affair. From the Chilukweyuk depôt to the furthest astronomical camp, fourteen days' journey for packed mules,

we had to feed the animals entirely on barley; so thick was the underbrush that it was impossible for the mules to get into it from off the trail.

If ten mules started for the far-away camps, five had to be loaded with barley, to feed themselves, and the other five packed with rations. The cost was enormous, as the grain had to be obtained from Chili, our consumption sometimes amounting to 1,000 lbs. per day.

This difficulty was greatly enhanced by the mosquitoes, the grass lands being so infested with these pests as to render grazing impossible. East of the Cascades we needed grain only in wintering, the timber being open and grass abundant.

It would take a volume to describe the cutting and marking the 'Boundary line.' The illustration drawn from a photograph of one of the camps, east of the Cascades, shows the tangle we had often to work in. The line is cut through the timber, from the coast to the eastern slopes of the Rocky Mountains; marked by an obelisk of faced granite at its commencement, then for a short distance by iron posts, the remainder by stone cairns placed at varying distances but in conspicuous places. The working staff was generally

from 120 to 150 men. But as all the details of this formidable undertaking will be published in the Commission report, it would be useless to give them in a work more particularly referring to the natural history of North Western America.

CHAPTER XI.

INDIAN DOGS.

THESE faithful animals, that cling to man through good and evil, are of the utmost importance to the native tribes inhabiting the Pacific and Atlantic sides of the Rocky Mountains. On the eastern slope, the Thickwood Crees, who occupy the country to the west of Lake Winnipeg and the northern boundary of the Saskatchewan, manage their transport with horses and canoes during summer, and in winter with dogs only.

In summer, dogs carry the loads on their backs on pads. In winter, the Indians travel on snowshoes, and then harness the dogs to light sleighs, which they tug over the snow. A pretty sight it is in bright summer time, when hill and valley are alike clothed with a luxuriant vegetation, to see a train of dogs trotting along with their little loads, stopping continually to take a good sniff at some attractive perfume, or lap from a tempting

pool. Such idlers get constantly in rear of their comrades; the sharp crack of the Indian's whip recalling the truants to a sense of their indiscretion, they gallop with all their might to overtake the train; an undue haste, the usual result of which is to scatter the load along the trail. Then the culprits get a real taste of the thong, and are re-packed. Every now and then they have a row, and, reckless of loads, roll one over the other, a very heap of dogs, all seeming to have an individual interest in the quarrel of any two. Sticks, whips, and kicks quell the riot; the packs again adjusted, on they trot.

In winter, when a trackless expanse of dazzling white extends in every direction from sky-line to sky-line, it is quite a picturesque sight and pleasant to witness a travelling party of Crees. The dogs, now harnessed to light sleighs (some of them made with runners, others simply a flat piece of board turned up at each end), jog after the men, who, shod with snow-shoes, stride along on the snow, as if it was hard ground; crossing lakes and rivers on the ice, impassable at other periods of the year. Each dog has usually a little string of bells round its neck, and as the bells are of different tones, the jingling music ringing clearly and sharply through the frosty

air, sounds as cheery and welcome as the song of the first migrant.

Other tribes in the Saskatchewan district (the Prairie Crees, for instance), instead of packing their dogs, use the 'travaille,' which is a triangle formed of two poles; the two smaller ends, fastened together, rest on the dog's shoulders, being kept in place by a leather strap fastened round the neck; a cross pole or two at the other end stretches them open and serves to make fast the load. This strange contrivance hauled along is better than packing, and available in the summer when there are not sleighs, but inferior to sleighing in winter, as dogs always work more cheerily when six or eight are harnessed together, than when each has its labour to perform singly.

This 'travaille' is also used by the Crees for their horses, when moving their lodges and camp equipment. It often happens that an old squaw and two or three naked little savages are perched along upon the back of a horse, with its 'travaille' and load, like birds upon a roost, the horse nearly hid by the poles and savages; the load and animal's head appear joined by a body composed of a clump of grotesque figures, their legs lost on the horse's sides. Coming suddenly upon such an apparition, amidst the

shadow of the silent forest, has often scared my horse, and for the moment startled me.

West of the Rocky Mountains I have never seen Indians use dogs for any system of transport; they either pack what they have to carry on the backs of horses, where canoes are not available, or failing either of these, the unfortunate squaws do the work of beasts of burden. The inland tribes use dogs solely for the chase and protection of their camps. Along the coast several tribes at one time kept dogs of a peculiar breed, having long white hair, that were annually shorn as we shear sheep, and the hair so obtained was woven into rugs, sometimes mixed with the wool of the mountain goat, at others duck feathers, or wild hemp, finely carded. Several of these most curious rugs are in the Ethnological room at the British Museum, visible to any who may be curious to see weaving in its most primitive form. I obtained them at different places along the coast. The simple machine or loom, if it may be so designated, used in weaving these rugs is also visible in the collection of the 'Economic Museum' at Kew.

It is a singular thing if these remote tribes discovered for themselves the art of weaving; for they knew and practised weaving dog-hair

fabrics before (as far as I know) they had intercourse with any civilised races. The art of dyeing the hair, and materials used with it, of different colours was also known to them, thus producing a regularly designed coloured pattern. Since the Hudson's Bay Company introduced blankets, the native manufacture has entirely ceased, and the dog from which the hair was procured is extinct or very nearly. Whence came this singular white long-haired dog, possessed by only a few tribes inhabiting the coast, scrupulously kept on islands to prevent their extending or escaping, and differing in every specific detail from all the other breeds of dogs belonging to either coast or inland Indians? There are two ways, it would appear, in which it is possible for it to have been imported. The more probable supposition is that it came from Japan; and I am informed by a friend who has been there, that the Japanese have a small long-haired dog, usually white, and from description very analogous to the dog that was shorn by the Indians of the coast and of Vancouver Island.

There can be little doubt that the Japanese visited the coast of North Western America long prior to any other people; whether accidentally wrecked, or designedly landing to trade with the

natives, is not by any means clear. Traditions still exist amongst the Indians, near the mouth of the Columbia, of strangers having once been amongst them, long before they had seen Europeans; and still more confirmatory of the story's probability, words undoubtedly of Japanese origin are still used in the jargon spoken on the coast called Chinook. If this is true, then I can see nothing very extraordinary in dogs having been on board the ship or junk visiting the coast, that they became the property of the natives, and that the art of weaving was learned from those who brought the dogs. More than this, the first possessors of these white dogs were, as far as it is possible to trace it, Chinook Indians, a tribe once very numerous, and living near the entrance to the Columbia river; thence the dog reached Puget's Sound, and eventually must have been carried to Nainimo across the Gulf of Georgia. Supposing it not to have been brought from Japan, the only other way it could have come must have been from the north, which is far from likely. That the dog was not indigenous, I am quite sure.

An immense variety of dogs are at present called 'Indian dogs,' but nearly all of them, wherever the Indians have been in trading com-

munication with whites, are either crosses with the native dog, or curs of various patterns brought by ships, emigrants, or fur traders.

The true Indian dog, as I have seen it in the Kootanie country, among the Spokans, and other tribes that have had no opportunity to cross the breed with any imported dog, is beyond all question nothing more than a tamed cayote or prairie wolf (*Canis latrans*); a most apt and appropriate name, for a greater thief does not exist. Although partially domesticated—by that I mean taught to hunt, come when called, and forsake their wild brethren—still they retain every type and character of the untamed animal. This animal, called a cayote, a name of Mexican importation, the 'italipus' of the Indians living at the Columbia's mouth, is not a true wolf.

This the Indians clearly know, inasmuch as the 'italipus' figures in every legend as being the animal whose form the bad spirit always assumes when doing evil and acting adversely to the good spirit. It seems to have taken a conspicuous place in the myths of the red man, utterly different from that of any other animal, and to be identified with his earliest history in a way that neither the true wolf or fox has ever been. The 'cayote' is to my mind a connecting

link between the wolf proper and the fox. Its appearance, colour, form of head, and habit of hunting in packs, are all characters that ally it to the wolf; but true wolves, as far as I have been able to investigate their habits in North Western America, invariably have their young in caves, clefts in the rocks, or any place where digging is unnecessary; whereas the cayote has its young in burrows, precisely in the same way as foxes. The voice, too, is compounded of the howl or bay of the wolf, and the snappish oft repeated yap, yap, peculiar to the fox.

Camping near the skirts of a forest on the Cascade mountains, in chilly autumn, when the days so far shortened make the evenings tediously long to one alone by the solitary camp-fire, I have lolled and listened to the gradual cessation of sounds, that, one by one slowly ceasing, are at last hushed without your being aware of it, dying off into perfect silence; as day with its blue sky fades into the purple twilight, and twilight leaves behind it a black vaulted expanse, gemmed with sparkling stars; changes that have no apparent beginning or end. Then amidst this darkness and silence the peculiar cry of the cayote bursts out as if close to your ear; ere one ceases another commences, then another, and

so on until the darkness, in which nothing is visible save bright luminous specs, like spheres of fire, seems crowded with cayotes. A child could frighten away the entire assembly of lurking thieves; they lack the courage to face man, even when in hungry packs; if disagreeably importunate and noisy, it is only necessary to take a burning stick, rush at the glittering eyes, and, helter-skelter, off they scamper for the thicket.

This most peculiar double voice begins with a deep-toned kind of howl, that, rapidly running up into higher barking sounds, trends off at last into a kind of scream or prolonged yell, issued in jerks. Every dog that the Indians have uncrossed by an imported breed in British Columbia has this voice, and I have often and often been deceived, mistaking the bay of an Indian dog for the cry of the cayote. Even now it would be puzzling to a naturalist, if visiting the interior of British Columbia, to trace the origin of the indigenous dog. As an instance of what I mean, my own dogs consisted of a Russian setter, obtained at Fort Rupert, originally from Sitka; a thorough-bred pointer, and a spaniel; beside these the men of the Commission had a bull-dog and a legion of nondescript curs. To my certain knowledge these dogs interbred in numerous in-

stances with native dogs. In many localities where this interbreeding took place, no record will remain of a pointer, setter, and spaniel having ever been there; the type of the bull-dog, too, will be impressed on succeeding generations. To what conclusion could any one arrive, with these facts hidden? Such is the present condition of all the Indian dogs along the entire extent of the north-west coast; one may find types representing every known variety.

At Sweltza, a small lake west of the Cascades, near which the Boundary line passed, I saw a little tribe of Indians that had a number of dogs, that were hardly in any degree altered from the cayote; more than this, they actually burrowed deeply into the ground to bring forth their young, and it was a common thing to see the puppies playing as young foxes do, at the entrance to the burrows, dashing into them like wild beasts on the slightest alarm. We had one of the puppies at our headquarters in Vancouver Island; a regular little wolf, but unluckily he got under a cart wheel, and was crushed to death.

The following specific characters of *Canis latrans* express with a few trifling exceptions those of the true Indian dog:—

Larger than the red fox, but not nearly so large as the grey wolf (*L. griseus*). Muzzle long, slender, and sharp pointed like the red fox. Eyes rather nearer together than are those of the wolf; colour of eyes, light brown; pupil circular. Ears long, triangular and erect, thickly clothed with hair except at the meatus, where they are quite naked. Feet long; the five pads on their under surfaces naked and black; a sixth, but smaller one, projects from behind the carpal joint. Four clawed digits on each foot, with a claw corresponding to the dew-claw in our dog attached to the rudimentary thumb. Tail bushy, tipped with white hairs, and half the length of the head and body. The general colour ochreous grey, much lighter on the belly than on the back and sides; the back viewed from head to tail looks black, as each hair is tipped with black, although the remaining part and under-fur is plumbeous.

The longer hairs on the neck, which the animal bristles up when angry, are tricoloured; the lower two-thirds reddish brown; then a ring of white, and a black tip, together giving a most curious speckled look to the neck of an enraged dog or cayote.

The most marked change observable from domestication is in the hair, which becomes shorter,

softer, and more uniform in coloration, although the tail retains its bushy appearance. Whether this alteration in the coat is due to the greater warmth of the lodges, I cannot tell; diet can have nothing to do with it, for the dogs live in the Indian lodges pretty much the same as cayotes do when wild.

I have given this brief description of the cayote's specific characters under the head of dogs, because, as I have endeavoured to show, my belief is, the dog, indigenous to British Columbia, is nothing more than a tamed cayote.

The Indians use them only for driving game. Putting a pack of the wolfish scrubby curs into a pine forest is like loosing so many wolves; away they tear, rushing up everything that comes in their way. If a puma or lynx is scared into a tree, the dogs at once surround it, and keep up the extraordinary double bark I endeavoured to describe, until the savages, who know that something is tree'd when they hear it, hasten to the spot and shoot the prisoner. Bears are generally either tree'd or driven to the rocks; surrounded by these snapping pests they take no heed of the hunters, who, stealing close up, kill them, without risk of attack.

Entering an Indian camp on foot, be it night or day, is really a risky thing to do. The prick-

eared guards swarm out from every lodge, like wasps from a shaken nest, and without any enquiry as to what your business may be, make straight at your legs, biting too in real earnest, if stick and toe are not vigorously plied, until the squaws, rushing to the rescue, lay on with lodge-poles, and release you from an imprisonment very desirable if practised on 'Ephraim,'* but very disagreeable to legs thinly trousered.

The dogs are fed in great measure on fish; the salmon that die, as described in Vol. I., afford a rich banquet to dogs, bears, wolves, and foxes. If, however, imported dogs are fed for any time on salmon, they get a kind of distemper, called by the settlers 'salmon sickness,' which is nearly always fatal.

The 'cayotes' and so-called dogs are both subject to a kind of mange, producing redness and irritability of skin, followed by loss of hair, and rapid wasting. I killed several cayotes, so bad from it as to be barely able to walk, and it as frequently kills the dogs. Whether this affection, clearly contagious, first arose among the dogs, and was by them given to the cayotes, or *vice versa*, I was not able to discover. It is worthy of remark too, that the grey wolf never has it—

* Nickname for a 'Grizzly-bear.'

so say the Indians, and I certainly never saw it, although I have seen hundreds of skins. This induces me to attribute its origin to domestication; the tamed 'cayote' or dog, shunning the wolf, but interbreeding with the wild 'cayote,' thus propagated it.

CHAPTER XII.

THE NATIVES, THEIR CUSTOMS AND TRADITIONS.

WHENCE the native tribes originally came that people British Columbia and Vancouver Island I know not. We may suppose them to have come from the east, north, south, or west, write volumes in support of our pet theories, and argue for an indefinite time, after all to find ourselves just as we started. There they are; and that is about all we really know.

Their numbers, steadily decreasing, may be estimated at present as 30,000. The best division is into coast and inland tribes. The coast Indians are to a great extent dependant on the canoe, as the sole means of transport, the habit of sitting in which, continually, dwarfs and deforms the legs; add to this the custom of altering the form of the skull in infancy, and we account for the degenerate appearance of the coast savage when compared to the active horseman and hunter of the interior.

I can the better explain many of their customs by repeating some questions, and the replies to them, submitted by me to Dr. Tolmie of the Hudson's Bay Company's service, than whom there is no better authority on Indian customs and traditions, and to whose great kindness I am indebted for much valuable knowledge, and a hospitality the remembrance of which cheers one. Mr. Anderson, also late of the Hudson's Bay Company, kindly, at Dr. Tolmie's request, replied to many of my queries.

Question. The average size and weight (roughly estimated, or if practicable, by actual weighing and measuring) of the Nesqually Indians or the eight tribes speaking the Kliketat language?

Answer. (Anderson.)—Judging by the eye, I should say from 5 ft. 5 in. to 5 ft. 9 in.. Few would exceed the latter limit. They are by no means a large race of people. Weight probably from 130 to 150 lbs.

Q. The botanical names of the *Peu-hay* or bitter root; of *N'poolthla*; the *Mamun*, and *Siekywan*; also the *Calz*?

A. (Anderson.)—By the '*Peu-hay*' I presume is meant the *Spalt-lum* of the upper country. I have always regarded it as a mesembryanthemum.

Growing in the most arid localities, it flowers beautifully in early summer; but its foliage soon withers under the scorching rays of the sun as the season advances. The other 'bitter root,' the *Tra-chin* of the Carriers, is the bulb of the *Lilium Canadense*, flourishing in moist alluvial soils. I do not recognise the other varieties mentioned in this article under the names given.

Q. Have they any artificial way of modifying the form and appearance of the teeth?

A. (Anderson.)—No. At least not that I am aware of. Still they unconsciously do so. In the sandy districts the split salmon, in the process of drying, retains a portion of the comminuted sand driven by the winds. Hence in the process of mastication the teeth of the consumers are mechanically worn down. This to a transient observer might appear to be the effect of art, but it is not so. About the Dalles on the Columbia River (where, as you know, it is sandy enough) the natives before mid-age have the teeth worn nearly to the gums. Higher up, about Walla-walla and other places, the effect is not so conspicuous; not that the country is less sandy, but that the natives subsist more upon roots, and indeed have fewer salmon to eat. Among the Canadian voyagers of New Caledonia the same

effect is observable, and from the same cause. I give you a notable example, Theodore Larance, an old *habitué*, whom I dare say you know.

Q. Are Albinos found? The physical characters of their children, if they have any, or anything that can throw any light on their origin?

A. (*Anderson.*)—Yes, but rarely. There is now, or was recently, in this town a woman, a native of Milbank Sound, who is a true Albino. An unprincipled rascal from San Francisco attempted, under pretext of marriage, to carry off this unfortunate woman to California, where it afterwards transpired it was his intention to exhibit her as a show. The timely interposition of the authorities prevented this nefarious project. I know of one or two cases where the Albino condition was partially developed. You may recollect, after having read the work of Sir A. M. Kenrie, his having hired, near the mouth of the Westroad River, a young Indian, who afterwards guided him to the coast. This man, I may mention, *par parenthèse*, was still enjoying in my time in New Caledonia a green old age; and I need not say that whenever he visited my fort he was well received, as well for his grey hairs as for his fidelity to Sir Alexander. This old man, hale and hearty still in 1848, was

the father of a numerous family, all of whom were healthy save the eldest Coos-se-yea, who had assumed the chieftainship in place of his aged father, and who was nearly an Albino; that is, his face and body were marked in nearly equal proportions with huge blotches of livid white, contrasted with the tawny hue of the normal man of his race.

A. (*Tolmie*.)—The only Albino known of is the Ha-eel-tzuk or Milbank Sound woman, spoken of in Mr. A. C. Anderson's answer to Q. 4. She, as he states, is a true Albino, but is supposed to be a half-breed. Amongst the Hydah, or Queen Charlotte Island tribes, exist a family of coarse, red-haired, light-brown eyed, square-built people, short-sighted and of fair complexion. The oldest representative of this variety was twelve years ago an aged man, sixty or upwards, having all the above-mentioned characteristics well developed. In 1836 and 1837 I saw at Vancouver, on the Columbia River, a Chenook Indian, at least sixty years old, red-haired and with light-brown eyes. Brown-haired Indians of fairer than the average complexion are to be found amongst all the tribes from the Columbia River to Stikine in Russian territory, N. lat., 57°.

Q. Are there any ceremonies connected with the birth of a child, whether male or female?

A. (*Anderson.*)—None that I am aware of.

A. (*Tolmie.*)—Amongst the 'Sailish,' misnamed Flatheads, and the Kalleespelm, it was in primitive times the custom, amongst the wealthier families of a tribe, for the paternal relatives to present the mother on the birth of a child, with food, buffalo-robcs and leather, such things as the child would need. The maternal relatives made return of clothing and other valuables, but not of food. Amongst the Shahaptain or Nerpercés the mother gave presents but received none in return.

Q. Does infanticide occur to any extent; if so, what are the probable causes?

A. (*Anderson.*)—No.

A. (*Tolmie.*)—Amongst the Chenooks and the Indians of Puget's Sound, as well as the Chimsians or Fort Simpson Indians, infanticide and causing of abortion are not uncommon. Certain old women at Nesqually I knew were reputed experts at the last-mentioned business. The causes are, at first, shame at having a child without an acknowledged father; latterly, the desire of

unmarried women not to be hampered with children.

Q. In dressing and cradling children, do they compress the forehead or flatten the occiput, or adopt any methods by which other parts of the body may be affected?

A. (*Anderson.*)—No; at least not perceptibly.

A. (*Tolmie.*)—The Indians from Columbia River to Milbank Sound inclusive flatten the forehead; also the Yakimas and Kliketats or Whulwhypum amongst the tribes of the interior, speaking the Walla-walla language, otherwise known as the Kliketat. The north-western tribes from Milbank Sound to Fort Simpson, and perhaps farther north, compress the vertex or crown so as to flatten that part of the head. The Sailish, Kalleespelm, &c., in dressing an infant, leave the head, shoulders and hips uncompressed. They bandage the waist and legs with the view of producing a broad-shouldered, small-waisted, and straight-limbed adult.

Q. What the average size of families, and are births of more than one child common?

A. (*Anderson.*)—I cannot state the average. Twin-births are rare, however, in my experience.

Q. To what age do females continue to bear children, and how long do they suckle them?

A. (Anderson.)—Probably from 40 to 46. It is hard to arrive at the ages of Indians, male or female. 2nd. Sometimes from two till three years.

Q. Is chastity cultivated or defective?

A. (Anderson.)—Among the interior tribes chastity is a virtue. Among the fish-eaters of the north-west coast it has no meaning, or if it has it appears to be utterly disregarded.

A. (Tolmie.)—Amongst the interior tribes, in primitive times, breaches of chastity on the part either of married or unmarried females were often punished with death, inflicted either by the brother or husband. Amongst the fish-eating tribes of the rivers and coast chastity was less esteemed. A vast deterioration in this respect has taken place amongst all the Indian tribes since the influx of whites amongst them.

Q. What are the ceremonies and practices connected with marriage?

A. (Anderson.)—Interchange of presents chiefly and a purchase-money accruing to the father of the bride. Among certain tribes a kind of ap-

prenticeship is exacted, in hunting or otherwise, from the bridegroom.

A. (*Tolmie.*)—The suitor does not court, but when he has made a selection he sends his mother or aunt to the damsel with a proposal, to which she made no reply. The parents are then referred to, and should they have consented, the suitor watches for the damsel at the accustomed watering place and proposes to her. The consent being given, the suitor, accompanied by his friends, dressed in their best, and driving loose horses, goes to the parents' lodge. They then strip off their fine clothes, obtaining old ones in return, and allow the bride's friends to select horses from the *band* driven up. Soon after, the bride's friends, arrayed in their best, carry the bride on a robe to her future husband's lodge, and exchanging there their good clothes for old ones, leave without making any return for the horses received. Should the woman be badly used by her husband she is taken home by her mother or aunt, the father and brothers scrupulously avoiding interference. Interchange of presents is the invariable rule, a preponderance going to the bride's parents. At Milbank the ceremonies, which are tedious, are performed on a platform resting on

two canoes afloat, and surrounded by canoes of participants and spectators.

Q. Is polygamy permitted, and is divorce ever tolerated?

A. (*Anderson.*)—Polygamy is universal, regulated simply by the facilities for subsistence. Divorce is on the principle, as among all barbarous tribes, of *stet pro ratione voluntas*. But then the danger of objections on the part of the relatives is imminent.

Q. How are widows treated?

A. (*Anderson.*)—A rigid mourning is exacted amongst most tribes, except along the north-west coast, where frequently the females are dominant and exercise the privileges of chieftanship.

A. (*Tolmie.*)—If the Sailish widow behaves well she is treated well by the mother-in-law. In about two years, or when her shorn locks regain their wonted length, her mother-in-law points out the relative of the deceased she ought to marry; should she consent she is still regarded as a relative, but in case of refusal she is turned out of doors and deprived of all the deceased's property.

Q. Are they long or short-lived?

A. (*Anderson.*)—A hard question to answer. Instances of extreme longevity are, however,

very rare. As a general rule I think the scriptural limit is rarely exceeded.

Q. Have they any contagious disease, or any endemic disease, or goître, pelagra, plica, and the like?

A. (Anderson.)—Goître does not exist on this side of the rocky mountains. On the Saskatchewan and Pine River it is common.

A. (Tolmie.)—No goître known west of the rocky mountains.

Q. How do they generally dispose of the dead; and are implements, articles of clothing, food, &c., &c., deposited with the dead?

A. (Anderson.)—Among some tribes by burning, among others by burial in the ground, or depositing in canoes or boxes above the surface. Offerings are frequently deposited about the places of sepulture, and sacrifices of horses (and where slavery exists, of slaves) are made.

A. (Tolmie.)—The Indians dispose of their dead by interment or burning, or in canoes placed on trees, or rocks, according to the nature of the country. The carrier Indians of New Caledonia, and the Chimmesyans on the coast, and other tribes speaking their language, burn the dead. In New Caledonia, at the burning, the widow in

former days was thrust into the flames and severely scorched when the body of her husband was being consumed. She afterwards had to carry his ashes in a bag on her shoulders for two years, during which period she was the servant or drudge of his relatives. Thereafter the ashes of a chief were placed in an ornamented box or urn, which was never suffered to touch the ground, being fitted to rest on the end of a pole, stuck in front of the lodge occupied by the relatives of the deceased person. The other tribes in New Caledonia bury their dead. The carriers held triennial feasts in honour of deceased heroes, when the manly acts of the departed were rehearsed to the assembled guests. Women occasionally presided at these feasts.—Sailish. Along with Indians of note were interred the weapons they had used, buffalo robes, and the pipe and hat used by deceased; also a bundle of mocassins. At the burial of a Sailish chief the ceremonies were curious; the bravest woman of the tribe, one used to carrying ammunition to the warrior when engaged in fight, bared her breast to the person who for courage and conduct was deemed fit successor to the departed. From the breast he cut a small portion, which he threw in the fire. She then cut a small piece from the

shoulder of the warrior, which was also thrown into the fire. A piece of bitter root, with a piece of meat, were next thrown into the fire, all these being intended as offerings to the Sun, the deity of the Flatheads. The war pipe was then smoked by the assembled multitude, and thus the ceremony ended, except in cases where horses were killed. The burying of the hat was a great affair, there having been attached to it a piece of red cloth, six inches wide and six yards long, adorned with ermine skin, fringed with the wing feathers of the rocky mountain eagle, and having the tail as its appendage. When scouting in the immediate neighbourhood of the enemy, a Blackfoot or Flathead chief would ride at full gallop so near the foe as to flap in their faces the eagle's tail streaming behind, yet no one dared seize the tail or streamer, it being considered sacrilegious and fraught with misfortune to touch it. The chief was often shot during these Balaklava gallops, when a contest would ensue for the body and gaudy gear, such as, if all tales be true, once occurred on the plain of Troy for the body of Patroclus. At Nesqually I have known the remains of several bodies of relatives disinterred at different places, washed and re-enveloped in

blankets, &c., after which they were again buried in one grave.

Q. Is there any subsequent visitation of the dead? whether are they disposed of separately or in conjunction with other bodies?

A. (*Anderson.*)—Yes, by the widow mourning for her husband, the husband for the wife, or the parent for the child. Human nature, whether under a tawny skin or a white one, is equally the same.

Q. What is the received idea respecting a future state? does it bear the character of transmigration, invisible existence about their accustomed haunts, or removal to a distant abode?

A. (*Tolmie.*)—The Indian notions of a future state are, as far as I have been able to learn, dim and indistinct, but that they have notions of the kind is evidenced by the placing of bundles of mocassins in the grave as if for a journey, and the killing of horses, and of slaves, on the coast, to accompany the deceased. The Flatheads (*Sailish* and *Kalleespelm*), it is said, believed the Sun to be the Supreme Being, and that after death the good, *i. e.* the brave and generous, went to the Sun, while the bad remained near the earth and troubled the living; others

supposed that the worthless ceased to exist at death.

They believed, along with the Nesquallies, Yakimas, and as far as I know all the tribes, that beasts, fishes, and, at least, the edible roots of the vegetable kingdom, were once human beings. The Flathead tradition is that the son of the Sun came to the earth and compelled all these humans to swim across a lake of oil, on emerging from which they assumed their present forms, a reason being given for the particular shape and peculiarities of each. Bear, beaver, goose, &c.; for instance, the bear crossed by diving, and is therefore fat; the goose did not dive, and consequently has only fat on the neck and behind.

Q. Can the origin of their dogs be traced whence came the parent stock?

A. (*Tolmie.*)—With the Flatheads and Chimsyans, the tradition is that the son of the Sun was accompanied by a dog, when he came upon the earth. The latter do not say that the metamorphosis of humans into beasts was caused by the son of the Sun.

Q. Are the chiefs, whether of limited or absolute power, elective or hereditary?

A. (*Anderson.*)—Hereditary rank goes a great

way, but riches generally carry the palm. Instance: Lolo of Kamloops, formerly a scullion, now a so-called chief.

A. (*Tolmie.*)—The authority of the chiefs is limited, and depends greatly on individual force of character. On the coast, chiefship is hereditary by the female line. In the interior (Kliketat tribes and Flatheads), rank passes by the male line, but courage and ability are the best recommendations to leadership amongst the tribes encountering the hostile Blackfoot every summer in the buffalo-country.

Q. Have they any laws? If so, how are they preserved? How is delinquency punished and how are judges constituted? What are the crimes taken notice of by the laws? Is there gradation or commutation of punishment?

A. (*Anderson.*)—Yes, *i.e.* Social Laws, which as a point of honour are generally well observed. Any dereliction is generally remedied by the *ultima ratio*.

A. (*Tolmie.*)—No law but custom. Very troublesome characters sometimes shot by agreement between a few leading men in a tribe. Medicine men the most frequent victims of this and of individual vengeance. They frequently avert further evil by returning fees when the

patient dies, or by large payments when accused by a dying man of having caused his illness. Rival practitioners get rid of each other by practising on the credulity of dying persons as to the originator of their ailments. Murder is oftener settled by payment of property to the victim's relatives than by retribution, yet occasionally retaliation ensues after a settlement.

Q. Approximately the number of inhabitants? Has the number sensibly varied, and within what period? if so, from what causes?

A. (Anderson.)—The population is perceptibly on the decrease.

Q. Have they any mode of commemorating victories, by monuments, or hieroglyphics?

A. (Anderson.)—Not apparently, at least to me.

Q. Have they any sacred days or periods, any order of priests; if so, are they hereditary, elective, or determined by any particular circumstance?

A. (Tolmie.)—The Flatheads offered sacrifices to the sun on every solemn occasion, and the chief presided.

Q. Is there any idea of an order of inferior spirits, *i. e.* of ghosts, fairies, &c., &c.; of magic, witchcraft, or second sight?

A. (Anderson.)—They have.

A. (Tolmie.)— Their mythology is ample,

though little known, and their tales endless of the 'olden time,' when the animals and fishes were human and gifted with speech. They believe in the return of the dead, in second sight, and very strongly in necromancy or witchcraft; hence their intense dread of powerful medicine men. It was formerly the custom for young men to seek supernatural gifts by seclusion in the wilderness and fasting. Some thus became successful hunters, gamblers, traders or hunters, as the gift might be, whilst to the more crafty and ill-disposed was vouchsafed the frequently fatal gift of imposing on their fellows the belief that they were 'medicine men' or conjurers.

Q. Have they any distinction of stars or constellations?

A. (*Anderson.*)—The hunting tribes, like the Chaldean of old, are keen observers, and the order of the principal constellations is well observed by them in a rude way.

A. (*Tolmie.*)—They have names for several of the constellations.

Q. How do they divide time with reference to the year?

A. (*Anderson.*)—Chiefly by the natural order of the seasons. That is, when the crane appears in its northward flight, the goose, the ripening of

the different berries, the arrival or spawning of the different fishes, &c., &c.

A. (*Tolmie.*)—They divide the year into seasons denoted by the opening of vegetation, the ripening of different wild fruits, the coming in season of roots and of fish, the fall of the leaf and the setting in of winter.

I subsequently wrote to Dr. Tolmie to obtain for me a vocabulary of the Nesqually dialects, and at the same time requested him to give me the results of his valuable knowledge relative to the eight tribes speaking the Kliketat language. I insert the letter the Dr. was good enough to favour me with in reply, as it contains such highly valuable information:—

‘Nesqually, March 14, 1859.

‘My dear Mr. Lord,—

‘With the best possible intentions, it was out of my power to get the vocabulary, &c., ready for the departure of the “Otter,” and as time now presses I will at once plunge *in medias res* names of tribes speaking the Kliketat language, or dialects thereof, with statement of the district they each occupy.

‘1. Whulwhypum, wooded and prairie country between Vancouver and the Dalles, W.T. (Wascopam) base of Mount Hood.

'2. Tait-inapum. Base of Mount St. Helens, and headwaters of Cowlibz and Lewis rivers.

'3. Pishwanwapum (Yakima). Yakimaw, or Eyakema on Arrowsmith's map, valley.

'4. Walla Wallapum. Walla-walla River and neighbourhood.

'5. Wy-eilat (or Kyoose). Country running to the south of Walla-walla.

'6. Umatilla. Umatallow R. (Arrowsmith) and country extending thence westward to Dalles.

'7. Peloose. Entrance of Great Snake River and surrounding country.

'8. Wyampam. Falls of the Columbia above, and near the Dalles.

'I cannot give the numbers of these tribes, but would say at a venture, that in all they could not turn out more than 2000 able-bodied men. In former times, prior to the advent of whites, the Whulwhypum used to plunder and kidnap the Chinooks of the Columbia River, whose country extended from the Dalles to the ocean; and the Pishwanwapum, better known by the name given them by the Colville Indians, "Yakimaw," did the same to the Nesquallies, Puyallips, and other tribes dwelling on Puget's Island. By the Chinooks, the Whulwhypum were called Kliketat,

and by the Puget's Sound Indians the Yakimaws are called "Stobshaddat," both words signifying robber or plunderer. On Puget's Sound the term is likewise applied to any Indians out on a raid. As the Whulwhypum dwelling on the prairies to the east and north of Vancouver became first known to the whites—the Hudson's Bay people of Vancouver—as "Kliketats," as the term was euphonised, so this name has of late been applied to the language, and to all Indians speaking it.

'The Kliketats—the term is used collectively—being excellent hunters, had within the last quarter of a century extended themselves throughout the Walamet valley and as far southward as the confines of California, becoming rich by supplying the American settlers in these countries with venison and horses. The Kliketats, although getting the upper hand of the aboriginal owners of these new hunting grounds, did not settle permanently therein, but in small parties were continually revisiting their native lands. In 1854, the territorial government of Oregon compelled these Indians to return to their homes, and withdraw permanently from southern Oregon, where their presence was annoying to the settlers. In 1855 they were treated with for the sale of their lands, which gave rise to the Indian war of

1855-56, in which the Kliketats bore a principal part.

‘Prior to the war of 1855, the Kliketats had many horses. Some chiefs, such as Peopeomuse-muse, counted their hundreds. The tradition is that horses were obtained from the southward, and that the Kliketats have not been for many generations in possession of them.

‘In their own country, the Kliketats lived on salmon, and to no great extent by the chase, game being scarce. The principal root used by them as food is the peahay, a bitter root which has an “elegant” bitter taste, and boils into a farinaeous jelly; next is the n’poolthla, which they grind into flour; again, the “mamun” and seek-ywa, which they knead into white cakes and use as biscuit; these also have a bitter flavour; lastly, the kamass, formerly *Scilla esculenta*, but now “kamassia,” I believe. The “calz”* which you saw here is also used as food by the Kliketats. They used, before the war, to cultivate potatoes and maize, and some of the chiefs had horned cattle.

‘I have never been able to find that the Indians of North West America, Kliketats or others, had

* Calz, a kind of wild sun-flower, the root of which is dried in the sun, and then consumed as an esculent.

originally any form of worship. They have, however, still a belief in familiar spirits in Chinook, "Tamanowash," whom they address when in difficulty. They consider that supernatural aid, or 'Tamanowash,' may be obtained for five objects, namely, the cure or infliction of disease, skill in hunting, and in gambling, courage, and invulnerability; lastly, success in the acquisition of property.

'A youth desirous of obtaining "Tamanowash" must adhere to strict cleanliness of person, and must abstain from sexual intercourse, as indispensable preliminaries; he must also leave the parental lodge of an evening and sleep by the shore of some distant and lonely lake, or in some other secluded place, night after night, until during sleep the Tamanowash communicates with him. By this way of acting, on returning to the lodge in the morning the parents know whether or not the son has been successful in his night's quest. Either the ambition of the sire, the son, or of both, will prompt to perseverance in trial. It is an Indian belief that when an Indian dies, or is killed, his Tamanowash passes to his son.

'Some say they have a grizzly bear as Tamanowash, others a woodpecker, the invulnerables an oak, and so on *ad infinitum*.

‘Most of the Kliketats flatten the forehead, but not so much as the Chinooks or Puget Sound Indians do. I am decidedly of opinion that the flattening of the cranium has no injurious effect on the adult brain. Infants undergoing the process occasionally suffer, when undue pressure has been applied.

‘The Indians of the present day have learnt the whiteman’s belief in a future state of existence beyond the grave, and the more reflecting seem to accept it with great satisfaction. When asked why the practice holds amongst them of burying property with the dead, and killing horses and even white slaves over the graves, the reply is that they follow the customs of their forefathers, who they think ~~must~~ have had a glimmering belief in a future state, and wished the property, &c., to be with the deceased wheresoever placed.

‘I should at an earlier stage have mentioned that the Wyeilat, or Kyoose, are considered for the numbers as the most formidable and warlike tribe of the interior, save the “Flatheads,” living east of Colville, and who do not flatten the head. These Wyeilat are not properly Kliketats, but interlopers to the southward, it is supposed; their original language now almost extinct, as the

elders die off, having affinity with that of the carriers of North Caledonia and the Umpqua Indians of Southern Oregon.

‘I must now conclude this very hurried epistle, which I should have taken more time about had you not desired to have the vocabulary ere the departure of the “Princess Royal.”

‘I am, my dear Sir,

‘Very truly yours,

‘W. F. TOLMIE.

‘John K. Lord, Esq.’

An illustration attached to this work represents three Spokane Indians, photographed at Fort Colville. The celt made of flint, also figured in the illustration page, the finest mounted specimen at present in the British Museum collection, I obtained from the Indian on the left side of the group. They had no history of it further than that it was of great age, and had been handed down from chief to chief for many generations.

The skulls* are drawn from three at present in the British Museum collection. The one altered, from circular pressure, was the skull I obtained at Fort Rupert; the flattened skull is

* Vide illustration: An Indian Burial Ground.

from Vancouver Island ; the unaltered one from Fort Colville. The system of flattening the head has been so frequently described that it is almost unnecessary to repeat it here. The cradle is figured from one in the British Museum collection, with the board arranged for making the pressure. The 'baby-jumper' is a very simple contrivance; a stick, springy like a fishing rod, is stuck obliquely into the ground with a string attached to the end of it; when the baby cries from the pain caused by the pressure, the mother hangs the cradle to the end of the stick, then jerking the string keeps up a bobbing motion that appears to lull and sooth the little sufferer to sleep. I quite agree with Dr. Tolmie in thinking altering the head in no way detracts from mental capacity; it only alters the shape of the box, it does not lessen its size. The various systems of hunting and fishing are already given in describing animals, and how fish are captured by Indians.

The illustrations are drawn from photographs. The one with two figures* represents a pure-blooded Indian, one of the Flathead tribe, who be it remembered do not in any way alter the form of the skull. The Flathead is the figure seated;

* Vide illustration : Two Indians photographed at Fort Colville, a pure Indian and half-breed.

the other standing is a half breed, an employée of the Hudson's Bay Company; his father was a French Canadian, his mother a Cree squaw.

The illustration in which there are three figures represents three Spokane Indians;* one, the figure to the left, has a stone celt, which I obtained; it is now in the British Museum collection, and deemed the finest specimen they possess. There was no record as to how it became his property, all I could glean respecting its history was that for a long period it had been handed down from father to son as a valuable heirloom; hereditary inheritance I find with Indians, as with whites, is weak to resist the all-potent dollar. The centre figure holds a rifle, which was not his own, but borrowed from Macdonald, the chief trader, for the occasion. The figure on the right has a bow and arrow, both of which were also purchased. The Indian bow is a masterpièce of skilful manufacture; its elasticity does not in any way depend on the wood used in its construction, but on the elastic ligament, procured from the fore leg of the elk; this is affixed to the wooden framework of the bow by a kind of glue made from the skin of the 'white' salmon, a glue when hardened resisting the influence of wet to redissolve it.

* Vide illustration: Three Spokane Indians.

This elastic back to the wood acts as would an india-rubber band; the bow when bent takes an arrow about a yard in length, which it propels with a force equal, for a short range, to that of a rifle bullet. When an Indian shoots, five or six arrows are held in the left hand, and as the string, which is made of tendon, is hauled back, the right hand brings with it an arrow; this one fired, another arrow is seized, and as rapidly as one could reasonably count, the six arrows held in the left hand are discharged. Had I my choice of weapons I should much rather encounter a savage armed with a trade gun than with a bow and arrows. Spare arrows are carried in a quiver made from the skin of their medicine animal, or 'Tamanowash.'

Flint heads for the arrows were once exclusively used, but since the Indians have acquired a knowledge of iron they employ it in preference to stone. But the trade gun has now in a great measure superseded the use of the bow and arrows.

Their lodges and canoes differ very much. The coast tribes live generally during winter in large sheds made of plank; three or four sheds often contain a whole colony, and constitute an Indian village. These sheds are before des-

cribed in the trip to Fort Rupert. They use lodges, or in other words, conical tents, when fishing and moving from place to place, during the summer; these lodges generally consist of poles covered with mats. The Sumass and Chilukweyuk Indians frequently use rush mats; the rushes are harvested, and brought from long distances, then carefully dried in the sun; when dry they are sewn together with long needles made of hard wood varying in length from six feet to four inches, threaded with cord twisted from the smaller rushes; mats thus made are perfectly rain-proof. The coast Indians usually cover their summer lodges with mats made from the inner bark of the Cedar (*Thuja gigantea*). These mats are platted together and exactly resemble bas, or matting, as it is usually called.

In platting the bark they manage to produce very beautiful patterns to ornament their mats; and as different tribes adopt each a pattern of its own, an Indian can readily tell to which tribe any particular mat belonged. Specimens of the rush and cedar bark mats are in the Indian collection of the British Museum, brought home by myself.

The inland tribes, as a rule, live winter and summer in lodges; some of the poorer tribes use



INDIAN LODGES.

rush mats, but the wealthier ones have the skin lodge shown in the illustration.* These are by far the best lodges used. The poles are covered with the skins of either deer or buffalo, sewed together with tendon, and the top is constructed to move round in accordance with the wind, thus avoiding the blinding effects of the wood smoke. The fire is placed on the ground in the centre of the lodge, and the inmates squat round it, or when sleeping arrange themselves like the spokes in a wheel, their feet to the fire and their heads towards the sides of the lodge. A good skin lodge is worth 50 dollars, 10/. The reader will get a clearer idea of the rush and skin lodge by comparing the lodge shown in the sketch of Symukwateen with the three shown in the illustration 'Indian Lodges.'

The canoes also are of various kinds; the canoe used by the Kootanies, described in a preceding chapter, is the general form of the bark canoe employed on all the rivers inland; on the coast and up the Fraser River the canoes are all dug-outs, that is, made from a solid piece of wood hollowed and shaped to the desired pattern. The Fraser canoe has the bow and stern different to the canoes used by the Van Island Indians. These again

* Vide illustration: Indian Lodges.

differ from the Nianimos as the Nianimos differ from the Fort Rupert, Queen Charlotte Islanders, and the various coast Indians.

Making a 'dug-out' requires great skill and patience. She must float evenly, be right in her lines, not too thick or too thin, and bilged at the sides to give breadth and sufficiency of beam. A small kind of steel adze is used nowadays, but in old times the Indians had only stone implements or tools, and with these managed to chop down trees, hew them into planks, and make canoes ('dug outs') as they make them now in the iron age. When the canoe is hollowed and shaped, it has then to be widened at the sides. This the savages ingeniously accomplish by first filling the canoe with water, then plunging red-hot stones into the water until it reaches to near the boiling-point; then sticks are forced in betwixt the sides, and the canoe allowed to cool; a second time the process is repeated, and so on again and again, until the desired expansion is accomplished.

I saw canoes at Fort Rupert ('dug outs') seventy feet long, that would carry thirty fighting men over a moderately rough sea as safely as a boat. The canoes and paddles are all painted with bright colours, red predominating; the device being generally the 'arms,' if I may so express

it, of the tribe. Some use an eye, others an eagle's head, others a frog; indeed, nearly every tribe adopts some rude heraldic symbol, but for what purpose I could not discover.

When staying at Fort Rupert I saw, by mere chance, what the Hudson's Bay trader called an 'Indian copper.' He told me that it was only on very high festivals that it was ever produced, and that its value to the tribe was estimated to be 15 slaves, equal to 200 blankets.

This wonderful 'medicine' was contained in a wooden case, most elaborately ornamented on its exterior with differently-shaped pieces of nacre neatly inlaid, brass-headed nails, and pieces of bone. The inside was lined with the softest kind of cedar-bark. The 'copper' was 2 feet $4\frac{1}{2}$ inches in length, wider at one end than the other, the wider end 1 foot $6\frac{1}{2}$ inches; and brilliantly painted, representing all sorts of curiously-shaped devices; interspersed amongst them were eyes of all sizes. It was made from a solid piece of native copper, that had been hammered flat. The trader also told me that some imitation 'coppers' had been made for the Company and offered to the Indians, but nothing would induce them either to purchase or have them as a gift. What use this 'copper' is I cannot tell, unless it is a kind

of standard similar to our regimental colours. It belongs to the tribe, not to the chief, and is kept by the 'medicine-men' or doctors, rain-makers, and scoundrels in general.

Not the least curious of the Coast Indian customs is that of masking. Imitations of the most hideous monsters conceivable are carved for masks from cedar-wood, and by a clumsy arrangement of strings these masks are made to roll the eyes, and open and shut the mouth. They use them when dancing, the only music a kind of drum or tambourine, hung round with the beaks of the sea-parrot, which rattle as the instrument is shaken and beat. Some cover their heads with swans-down, and as they bow to their partner, small portions fly off and settle on him; and this sending the down upon the opposite dancer is considered the great skill of the performance.

The Bella-hoo-la Indians, a tribe that resides on the banks of the Salmon river, make very beautiful baskets from the fine roots of the cedar; they also make hats and watertight vessels from the same material. The baskets are called *Zeilus-qua*.

The Indian cradle (*Spat-zun*) is made from cedar. Immediately after birth, the infant is subjected

to the process of flattening the head; a pad or compress is first put on the forehead, then bandaged tightly. The baby during this process is strapped into the cradle; a long timber pole placed obliquely, one end being fixed firmly in the ground, serves to hang the cradle on. Thus suspended, the child is kept continually jumped, by a string fastened to the lower end of the cradle and tugged at by a squaw. This primitive baby-jumper evidently lulls the poor little sufferer, the victim of an absurdly barbarous fashion. This pressure is continued at intervals until the child is able to run about. Other tribes make the pressure round the head, and thus elevate the vertex or crown so as to resemble a sugarloaf.

At their festivities, the Fort Rupert Indians use a most curious drink, which is thus prepared. They gather the berries of the *vaccinium* in the summer, before they are quite ripe, and press them into a firm cake about half an inch thick; this is carefully dried in the sun, and wrapped in bark. When this cake is to be used, about five ounces of it are placed in a large vessel, and a small quantity of cold water added. It is then stirred rapidly round and round with the hand, which must be perfectly free from grease, squeezed, and worked into a pastelike form; then more water is

added, and the rapid stirring continued. It now begins to look exactly like soapsuds, and the more it is worked about the more frothy it becomes. In this frothy state it is drunk. All who intend indulging in this foggy-fuddle come armed with immense wooden spoons; then they ladle and drink, until, nearly bursting, they shamle off to the water, a drink of which appears to allay the distention this fuddling occasions. I have often tasted it, but cannot say I like it; it has a disagreeably bitter flavour, suggestive of physic; and though stirred with a female hand, still the idea of dirt is so associated in my mind with Indians, that I could never get over the feeling that the fingers might have been previously used for other purposes, and the process of washing them forgotten. The dog's-hair blankets I have described in the chapter on Dogs.

The 'Indian Burial Ground' (*vide* illustration) was drawn from a photograph. The huge figures, carved from solid trees, are placed round the boxes in order to keep away evil spirits; small tin vessels, pieces of coloured cloth, the skins of small animals, and all kinds of odds and ends, are hung by the relatives of the dead on the boxes containing the body. One thing they never fail to do—that is, to bore the bottom of the tin cups or vessels

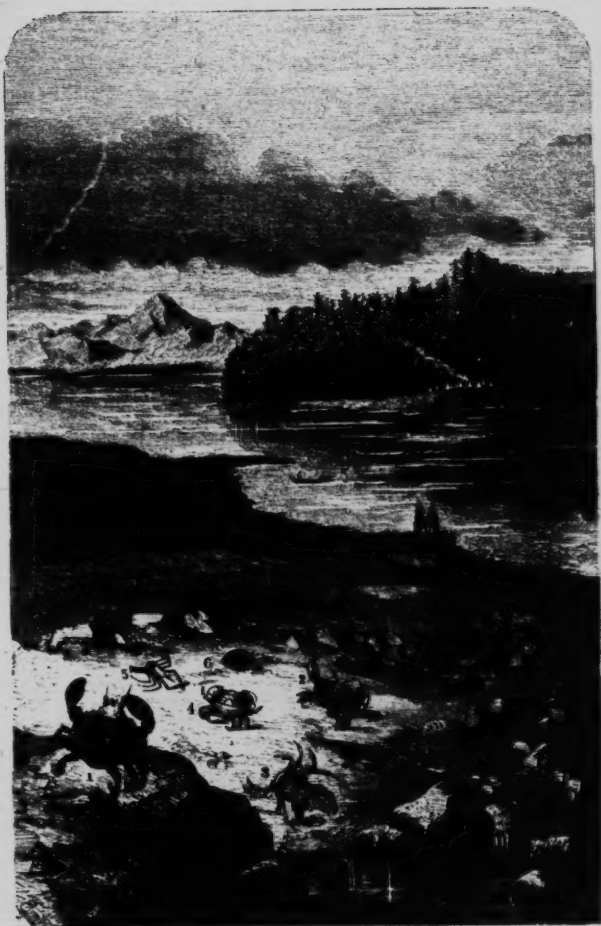
full of holes: thus rendered useless no one will steal them. Scattered on the ground are flint implements once used by the Indians, and the three skulls before spoken of. The one to the left is that of the chief, brought from Fort Rupert (*vide* trip to Fort Rupert, Vol. I.), showing the effect of circular pressure; the middle one is an unaltered head from the Upper Columbia; whilst that on the left shows the effect of flattening the forehead.

CHAPTER XIII.

DEPARTURE FROM FORT COLVILLE—VANCOUVER ISLAND CRABS.

WE left Fort Colville in April. The snow was still on the ground, and everything very sloppy and wet. During the winter grain was taken out in sleighs, and distributed at different stations along the route. This enabled the Commission to start much earlier, as the mules by this arrangement were not dependant on grass. We followed the same course on our return as we did on coming up, a route already described. At Walla-walla we transferred all the mules and horses to some persons to whom the Commissioner had sold them, embarked in the steamer, reached the Dalles—thence the Cascades, Fort Vancouver, and Portland, from which place the ocean-steamer took us to Vancouver Island to await shipment to England. I added many things to my collection during this time, amongst them a variety of crustaceans (*vide* illustration).

On my return I submitted them to Mr. Spence



VANCOUVER ISLAND CRABS.

- Fig. 1. *Petalocerus bicornis*.
 " 2. *Chlorodius imbricatus*.
 " 3. *Pugettia Lordii*.

- Fig. 4. *Platycarcinus recurvidens*.
 " 5. *Oregonia longimana*.
 " 6. *Cryptolithodes altissura*.

Bates, F.R.S., who named and described the new and other species; I append the report he very kindly sent me.

(The new species of crustaceans, collected on the east side of Vancouver Island, were some of them dredged in from eight to ten fathoms water; the rest were collected between tidemarks).

Mr. Spence Bates says, in speaking of the collection generally:—‘The extremely opposite and varied localities in which many of the species here represented have hitherto been found, suggest the idea that Vancouver Island corresponds with the extreme limit between a northern and a tropical fauna. It is only in this way I can account for finding the representatives of tropical species with others that are found only (on the eastern coast of Asia) in the Arctic and, perhaps, North Atlantic Oceans.’ That he is quite correct in this assumption I think there can be no doubt; for not only does it apply to the crustaceans, but with equal force to all the molluscous groups. Several new species of shells, collected at the same time and in the same localities as the crustaceans, which were named and described by Dr. Baird, with appended notes by myself, and published in the Zoological Society’s Proceedings for the year 1864, are

identical in some cases; in others closely allied to known species from Japan, Australia, and the shores of our own island.

The tidal irregularities of this coast are perfectly inexplicable. In May, June, and July, during the twenty-four hours, there is but one high and one low water. At the change and fall of the moon, high-tide happens near midnight, and varies but little as to time during these three months. In August, September, and October there are two high and two low tides in the twenty-four hours. Then in the winter months (November, December, and January) the regular twelve-hour tides recur; but highwater is at twelve o'clock in the day, instead of twelve at night. The spring-tides range from ten to twelve feet, the neaps from five to eight.

The temperature of the sea, taken during the summer months near the surface, ranges from 52° to 56° F. The sea-water seldom, I may say never, looks clear, but always presents a turbid muddy appearance, as if a large quantity of sand was mixed with it. This may in some measure be accounted for by assuming that strong under-currents flow from north to south, and sweeping past the island, and being (from their low specific gravity) close to the bottom, stir up sand and

mud. The sea-bottom in and adjacent to the numerous bays, harbours, and long canals—which, like the fiords of Norway and Sweden, everywhere intersect the mainland and inland coasts—varies in accordance with the character of the bounding rocks: where trap, soft clay slates, or felspathic rocks form the coast-line, a thick blue clay is the usual bottom; where grit and sandstones, there it is sandy.

Little, if indeed anything, is as yet known of the deep-sea productions from the west side of the Island, which will afford a rich harvest to future explorers.

PUGETTIA LORDII, N. S.—Carapace quadrate behind the orbits; the anterior portion abruptly narrowing, and produced into a double rostrum, the horns of which divaricate. The anterior extremity of the orbital margin is produced to a sharp point—that is, elevated slightly above the beak; the posterior extremity is defined by a distinct fissure. The anterior hepatic region is produced by a tooth immediately posterior to the postorbital fossa, laterally extended to an obtuse tooth or point, and posteriorly separated from the branchial regions by a decided fossa or lateral constriction. The branchial region is laterally produced to a strong anteriorly-curved

point. The dorsal surface is tolerably smooth, exhibiting but faintly the markings of the internal viscera. The eyes are small, and reach but little beyond the orbital margin. The external antennæ have the first joint fused with the carapace, the second and third compressed and arcuate, and terminate in a smooth flagellum.

The first pair of pereopoda are moderately long, having the meros triangulate, the upper angle forming a prominent carina, that extends along but terminates abruptly a little short of both extremities of the joint; the carpus is tricarinated; the propodos is laterally compressed, and forms about half the length of the limb, and is about one-third its breadth. The dactylos is slightly curved and slightly serrated on the inner margin, and antagonises at the extremity with the produced propodos. The second pair of pereopoda are nearly as long as the first, but much more slender, having the meros and propodos subcarinated. The three posterior pairs are shorter. The pleon is small and narrow, the second and third segments being the broadest; while the seventh is abruptly narrower than the sixth, and forms a triangular plate. The female differs from the male in being more protuberant over the stomachal region, and consequently the ros-

trum is more depressed; anteriorly, there is less development of the lateral branchial teeth, and there is a relatively greater distance between the fifth pair of pereiopoda. The pleon is almost circular, and covers the entire surface of the ventral region.

The colour of the animal is of a reddish-brown, which increases in brightness as it approaches towards the extremity of the chelæ. In one or two young females the carapace was smooth and glabrous.

Found in tolerable abundance in Esquimalt and Victoria Harbours, and, indeed, in all the sheltered inlets along the mainland coasts from the mouth of the Fraser to San Francisco. Dredged in about eight fathoms of water, but easily obtained in pools at extremely low tides. Its favourite haunt is under a large flat stone, or hid under the seaweed that fringes the margin of a pool. The specimen from which the drawing was made was taken in Esquimalt Harbour.

SAYAS LYRATUS (DANA). N. S.—Explor. Exp. p. 86, pl. i., fig. 1.—From the Straits of Georgia, U. S.

OREGONIA LONGIMANA, N. S.—Pereiopoda prima in longitudine bis carapacia.

Carapace coarsely granulated or minutely tuberculated, free from hairs, except upon the

rostrum, which is slender, and twice the length of the interorbital space. Pleon in the male narrow, concave upon each side, corresponding with the fourth, fifth, and sixth segments. Telson rather broader than the preceding segment, and emarginate at the terminal extremity. The first pair of pereiopoda are very long, being twice the length of the carapace, and much longer than in either of the species described by Dana and Stimpson. The meros reaches quite to the extremity of the rostrum, and is furnished with two or more longitudinal rows of small granulated tubercles; the propodos is rather longer than the meros, and its breadth is equal to about one-third of its length; the dactylos is about one-third the length of the propodos, slightly curved, and minutely serrated on the inner margin, which impinges throughout its entire length upon the produced extremity of the propodos. The three succeeding pairs of pereiopoda are imperfect in the only specimens procured, but the last pair are long, cylindrical, slender, and terminated in a powerful dactylos.

This crab was obtained in Esquimalt Harbour, and in its habits and general distribution are very similar to the preceding.



OREGONIA GRACILIS (DANA).—Sill. Am. Jour. Sec. 2, x.
Taken in from eight to ten fathoms water, in Esquimalt Harbour,
Straits of Georgia.

OREGONIA HIRTA (DANA).—Sill. Am. Jour. Sec. 2, xi.
p. 270. Straits of Georgia, U. S.

CANCER PRODUCTUS (RANDAL).—Esquimalt Harbour.

PLATYCARCINUS RECURVIDENS, N. S.—Dentes anterioris lateralis regionis habens novem recurvos et granulatos.

This very pretty species may easily be distinguished by the sharp points of the inner lateral teeth, granulated or minutely baccated along the margin, and having the apex recurved. The intraorbital margin is three-lobed and granulated, the centre lobe being the smallest. The dorsal surface of the carapace is granulated on the prominent lobes in the larger specimens, but almost smooth in the young. The first pair of pereiopoda have also lines of granulations along the outer surface of the propodos and carpus.

Dana has merged this genus into that of *Cancer*, but the greater length of the animal in relation to its breadth is a very convenient generic diagnosis, and one that appears to correspond with Milne Edwards' description relative to the more longitudinal position of the two pairs of antennæ.

The specimens were obtained in Esquimalt Harbour. It frequents pools between tide-marks;

and it is common everywhere along the Oregon and Vancouver Island coasts.

ERIPHIA GONAGRA (EDWARDS).—Hist. des Crust., folio 1, p. 426. Esquimalt Harbour.

PANOPEUS CRENATUS (EDWARDS and LUCAS).—Esquimalt Harbour.

XANTHO DISPAR (DANA).—Esquimalt Harbour.

XANTHO BELLA (STIMPSON).—Esquimalt Harbour.

CHLORODIUS IMBRICATUS, N. S.—Anteriorem regionem carapacis habens imbricatam irregulariter; posteriorem planam; carpum et propodon pereopodum parvis primi rugosa.

Carapace having the posterior portion smooth, the anterior being rough with flattened prominences, that form an irregularly imbricated surface. Anterior margin five-toothed, the central tooth being the largest, the posterior the most prominent. A small secondary tooth stands upon the anterior surface of the fourth and fifth teeth. The first pair of pereopoda are short and robust; they have the carpus deeply corrugated upon the external surface; a slight rib is also present upon the carpus of each of the four succeeding pairs of pereopodos.

Only a single specimen of this pretty little species was obtained. It was dredged in about eight fathoms of water, in Esquimalt Harbour.

OCYPODE URVULII (GUERIN).—Esquimalt Harbour.

GRAPSUS LIVIDUS (DANA).—Esquimalt Harbour.

HEMIGRAPUS SEDENTATUS (DANA).—Between the tide-marks, Esquimalt Harbour.

Dana records it from the island of St. Lorenzo, at Peru. It is remarkable for the great speed with which it runs across the dry sands to escape capture.

GELASIMUS ANNULIPES (EDWARDS).—Esquimalt Harbour.

Dana records it from Singapore, East Indies, and Mr. Edwards from the Indian Sea.

PINNOTHERES FABIA (DANA).—Esquimalt Harbour, recorded by Dana from Puget's Sound.

CRYPTOLITHODES TYPICUS.—Brandt, Bull. de l'Acad. de St. Petersbourg, 1849, vii. 175; Stimpson, Crust. et Echin. of Pacific North America; Journal of the Boston Soc. of Nat. Hist., vol. vi. p. 472, pl. 20.

A specimen of this species, which was first described by Brandt, and afterwards more fully, as well as figured, by Stimpson, was taken in Rosario Strait, Vancouver Island, as well as in Upper California.

The male, which has not hitherto been described, differs from the female in being less produced posteriorly. The posterior margin, instead of being projected in an arch inversely

corresponding with that of the anterior margin, traverses a line that is nearly direct from side to side, slightly posterior to the points of the broadest diameter in the carapace. The pleon is triangular, and smaller and narrower than in the female, having the lateral margins more straight and symmetrical.

The only male specimen in the collection is smaller than the female, and the surface generally more tuberculated. The right propodos of the first pair of pereopoda is larger than the left, and is so well developed as scarcely to be capable of being folded within the limits of the carapace. The length of the male animal, from the extremity of the rostrum to the centre of the posterior margin of the carapace, is about three-fourths of an inch; its breadth, from the point of one lateral extremity to the other, is about one inch and a quarter. The size of the largest female in the collection is in length about one inch and a quarter, and breadth about two inches.

CRYPTOLITHODES ALTA-FISSURA, N. S.—Fœmina

Carapax est dorsaliter lævis; rostrum quadratum; oculorum alvei altæ-fissuræ ex utra parter ostri; sunt pleon ex læva propodis par primus subæqualia et lævia cum carinâ supra dactylos.

This species may readily be detected from the two previously known by the smoothness of the carapace, propodi, and pleon, and more distinctly by the deep orbital notch on each side of the rostrum.

The carapace is nearly as broad again as long, and produced considerably, posteriorly to the cardiac elevation, a feature that appears to belong to the female.

The rostrum is broad, flat, and rectangular. The antero-lateral margins are produced so far anteriorly as to be nearly in a line with the extremity of the rostrum; a deep notch, in which the eyes are situated, exists on each side of the rostrum. The anterior margin is slightly marked with distant small points; the posterior margin is quite smooth and even. The dorsal surface is quite smooth, and pencilled in light red upon a yellowish ground, the red pencilling being fine and delicate, following the contour of the margin and surface of the carapace.

The pleon is subsymmetrical and very smooth, and planted considerably within the posterior margin of the carapace. The second segment (first visible) has the marginal plates fused with the central. The sixth segment is without lateral plates; and the telson is situated beneath

and anterior to the posterior extremity of the sixth segment.

The eyes are small, and placed upon peduncles, that gradually taper from the base to the extremity. The first pair of antennæ are short, and developed upon the type of those of the brachyura; but the first joint is reduced to a size that is only about twice the diameter of the second. The second pair of antennæ are but little longer than the first, and are furnished with a broad round scale at the third joint, and a terminal flagellum, that is about the length of the fifth joint of the peduncle. The squamiform appendage is circular and dishlike; the inner margin is straight, or somewhat excavated.

The second pair of gnathopoda have the third joint much broader than the fourth (the secondary appendage reaches not to the extremity of the third), and have the terminal joints small and rudimentary. The first pair of pereopoda are subequal in the female, the propodos upon the right side being somewhat larger than on the left; the surface is smooth and even, and the dactylos is furnished with a prominent carina, that terminates abruptly near the basal articulation, and loses itself gradually towards the apex. The fifth pair of pereopoda are completely

hid from view; the three basal joints are short; the two terminal ones subequally long, and furnished with a copious brush of strong cilia. These appendages are folded together and enclosed within the branchial chambers, where they, no doubt, fulfil the office of the flabella of the highest forms of crustacea; affording an interesting illustration of an organ being converted, by the force of circumstances, from its original purpose to the fulfilment of another, for which it was apparently most unsuited.

PETALOCEROS BELLIANUS (WHITE), Proc. Z. S. 1856, p. 134.—Between tidemarks, Esquimalt Harbour.

PETALOCERUS BICORNIS, N. S.—Rostrum in duo cornua divisum habens.

Carapace triangular, anteriorly produced into two horizontal hornlike processes, tuberculated with nodulated prominences all over the surface, but furnished with a series of large tubercles corresponding in a line with the external margin of the carapace; the antero-lateral margin, constricted between the branchial and hepatic regions, furnished posteriorly to the orbit with two strong blunt processes, and posteriorly to the central constriction; armed laterally with two distinct narrow processes, and posteriorly with six closely-situated large round tubercles.

The pleon is nearly symmetrical, being rather larger on the left than the right side. Each segment is defined by a marginal prominence; that upon the left side is continued from near the middle to a process that terminates in a point or tooth at the side; but that on the right becomes confluent with a posterior ridge, and forms an irregular circle, the centre of which is deeply depressed.

The eyes are small, of a green colour, and surmounted on denticulated peduncles. The first pair of antennæ consist of three equal-lengthened joints (of which the first is more robust), together with a short, stout, pilose flagellum, and a slender secondary appendage. The second pair of antennæ have a compound scale, consisting of two large and two short compressed processes, and the third joint is furnished with two or three sharp strong processes. The first pair of pereiopoda are chelate and strong, echinated with blunt-pointed spines, and terminate in fingers that are flattened at the extremity, and furnished upon the outer surface with numerous tufts of hair, that spring from the summits of the numerous tubercles that are found there. The second, third, and fourth pairs of pereiopoda are more slender than the first, resemble one

another very considerably, and are furnished with short, sharp, and slightly-curved dactyli. The fifth pair of pereiopoda are rudimentary appendages; they consist of but five joints, the last of which terminates in a blunt extremity, that is furnished with a considerable brush of hair, and is probably used for the purpose of cleansing the branchial appendages.

The pleopoda are present in the female, with the exception of the first pair (which are small), only upon the left side of the pleon, as exemplified in our specimen.

This species differs from White's *P. bellianus* in having a horizontal bifurcate rostrum to the carapace, being more distinctly tuberculated, and in the pereiopoda being more strongly spinated.

This handsome species is of a yellow colour, picked out with purple between the tubercles.

It was dredged in Esquimalt Harbour, in ten fathoms of water.

ECHIDNOCERUS CIBARIUS (WHITE).—Victoria and Esquimalt Harbour.

PORCELLANA EDWARDSII (DESAUSURE).—Esquimalt Harbour. M. Verreaux obtained it at Magellan.

PORCELLANA EUPICOLA (STIMPSON).—Esquimalt Harbour.

Mr. Stimpson says that the members of this remarkable genus are the largest crabs known:

they do not, indeed, cover so much space as do many of the *Maiaæ* with their extended legs; but their carapax is nearly as large and their weight greater than even the *Macrocheira* of Japan. Specimens have been taken the weight of which exceeded seven pounds; the diameter of the carapax is over ten inches.

EUPAGURUS PERLATUS (EDWARDS).—Esquimalt Harbour. Dana records it, from Callao, Peru, and Chili.

EUPAGURUS ARMATUS (STIMPSON).—Esquimalt Harbour.

CENOBITES DIOGENES (EDWARDS). *Vide* vol. ii.

CLIBANARIUS LINEATUS (DANA).—Esquimalt Harbour.

CLIBANARIUS TURGIDUS (STIMPSON).—Six fathoms water, in Straits of Feuca.

CRANGON VULGARIS.—Esquimalt and Victoria Harbours.

ASTACUS KLAMATHENSIS (STIMPSON).—In all streams east of the Cascades.

HYPPOLYTE ESQUIMALTIANUS, N. S.—Rostrum longius quam carapacem habens; quatuor dentibus supra armatum juxta basem et septem infra; quatuor posterioribus junctim locatis; tertium segmentum pleonis posteriore productum habens.

Rostrum as long as the carapace, armed with four teeth at the base; the posterior being just behind the orbits, and the anterior being near the centre of the rostrum; the anterior half of the rostrum being straight and smooth. The inferior margin is excavate at the base, and furnished with seven small teeth; the four posterior being near together and posterior to the centre of the

rostrum, the three others being further apart, the most anterior being subapical.

The third segment of the pleon is dorsally produced posteriorly to a point. The eyes are small: the superior antennæ have the primary ramus of the flagellum tolerably robust, and reaching to about two-thirds the length of the rostrum; the secondary slender, and longer than the primary. The inferior antennæ have the scale reaching to about three-fourths the length of the rostrum, rounded at the apex, subapically furnished with a small tooth upon the external margin: the flagellum wanting.

First pair of pereopoda short, robust, chelate; second pair long, slender, and chelate; the posterior terminating in a robust dactylos.

Taken in Esquimalt Harbour.

HYPPOLYTE BREVIROSTRIS (DANA). — Esquimalt Harbour.

HYPPOLYTE LAYI (OWEN). — Esquimalt Harbour, — at Monterey, by Captain Beechy.

PANDALUS DANÆ (STIMPSON). — Esquimalt Harbour.

GEBIA PUGETTENSIS (DANA). — Esquimalt Harbour.

CALLIANASSA LONGIMANA (STIMPSON). — Puget's Sound and Straits of Feuca.

ALLORCHESTES VERTICELLATUS (DANA). — Eight fathoms water, in Esquimalt Harbour.

Dana took it along the shore near Valparaiso.

ALLORCHESTES BREVICORNIS (DANA).—Dredged in six fathoms water, in Esquimalt Harbour.

Dana records it from the Bay of Islands, New Zealand.

MCERA FUSCA, N. S.—Antenniarum superiorum secundum articulum pedunculi non longiorem quam primum habens; flagellum et pedunculum subæqualia; gnathopodum par secundum cum propode magno palmam edentulatum habens; pereopodum posterius pares marginem posteriorem non serratam.

The body is long and slender; the superior antennæ are about half the length of the animal, the peduncle being scarcely longer than the flagellum; the secondary appendage being half the length of the primary, the second joint of the peduncle being about the same length as the first. Second pair of gnathopoda having the propodos large; palm without teeth, and defined by a small pointed process; posterior pair of pereiopoda having the posterior margin of the base smooth.

In its general appearance this species bears a near affinity to *Mæra grossimana*, as well as to *M. tenella*, from the Feejee Islands; the only appreciable distinctions being in the shorter length of the second joint of the antennæ, the absence of teeth from the palm of the hand in the second pair of gnathopoda, and in the even margin of the last (the only remaining) pair of pereio-

poda, and perhaps also in the shortness of the peduncle of the ultimate pair of pleopoda.

Only one specimen of this species is in the collection; and that was taken from a sponge dredged in about ten fathoms of water in Esquimalt Harbour. } It is of a brownish colour.

AMPHITHOE PEREGRINA (DANA).—Esquimalt Harbour.

Dana records this species as living amongst the roots of floating fucus, at sea, thirty miles south of Valparaiso.

AMPHITHOE ORIENTALES (DANA).—Esquimalt Harbour.

It is also recorded by Dana from Tongatabu, in the Pacific, along shores of coral in shallow water.

AMPHITHOE FILICORNIS (DANA).—Esquimalt Harbour.

It differs in no essential character from the specimen to which Dana has given the specific name, and which he obtained at Rio Janeiro.

IDOTEA WOSSENESSKII (BRANDT).—Esquimalt Harbour.

Dana records it from San Francisco; it has also been taken at Atcha and Sitka Sounds by Wosnesskii, and at Puget's Sound by Dr. Suckly.

IDOTEA MEDIA.—Esquimalt Harbour.

IDOTEA STRICTA (DANA).—Esquimalt Harbour.

JCERA WAKISHIANA, N. S.—Posteriorem marginem pleonis habens bis excavatum cuspidе intermedia supra cuspidatos margines non producta; antennae inferiores non possunt extendere supra quintum segmentum; pereionis posteriora pleopoda non longiora quam posteriori margo latus est.

Anterior margin of the cephalon nearly straight; pereion having the sides subparallel, the greatest width being at the sixth segment; pleon having a double excavation on the posterior margin, the central point not extending beyond the extremity of the sides. Superior antennae reaching to the extremity of the fourth segment of the inferior; inferior antennae nearly two-thirds of the length of the animal. Posterior pair of pleopoda as long as the posterior margin of the pleon, terminating in two styliform rami, each of which is tipped with a few short hairs.

This species was taken from a sponge dredged in about eight fathoms of water in Esquimalt Harbour.

The specific name is derived from the circumstance of the animal having been found on the territory of the tribe of Wakish Indians.

TANAIS LORICATUS, N. S.—Exemplum imperfectum; inferiores antennis semi-breviores quam superiores habens; gnathopodum primi paris propoda ovata dactylo breve et tumido; pereopodum primis tribus articulis brevibus et latis sunt, loricis ad pereionem adherentibus.

The only specimen in the collection is imperfect. The first segment of the pereion appears to be imperfectly fused with the cephalon; inferior antennæ scarcely half the length of the superior. First pair of gnathopoda having the propodos ovate; dactylos short and tumid, shorter and less pointed than the digital process of the propodos. Pereiopoda having the first three joints short and broad, being affixed to the side of the pereion like plates of mail (hence the specific name); they terminate in short pointed dactyli, and have the propodi armed with two lateral rows of strong black pointed teeth.

This species was taken from the hollow of a sponge dredged in Esquimalt Harbour, at the depth of about ten fathoms.

IONE CORNUTUS, N. S.—Mas: pleonem terminatum rotunde.

The male differs from the description of the European species, chiefly in having the caudal extremity terminating obtusely, and in having shorter antennæ.

Fœm., subequilateralis, lateralia cornua cephalonis habens recurvata, pleopoda longa et arborea.

The female has the antero-lateral hornlike process of the cephalon curved posteriorly. The pereion is not quite equilaterally developed. The

coxæ of the four anterior pairs of the pereopoda are round, and all attached to the antero-lateral margin of the segments of the pereion. The coxæ of the three posterior are the larger, and produced posteriorly to a point. The pleopoda are long, and fringed with arborescent branchiæ.

This is the only species known, besides that taken by Colonel Montagu on the southern coast of England.

Length, male, $\frac{1}{4}$; female, $\frac{3}{4}$ of an inch.

Taken attached to the branchia of *Callianassa longimana*.

My mission in North-western America is ended. The Hudson's Bay Company's steamer 'Labouchere' takes us to San Francisco, where we spend a very pleasant week, and I meet with many old friends, whom I had encountered mule-hunting. The mail-steamer takes us to Panama, where we have to remain a short time, to await the arrival of the English steamer at Colon. Panama has been so often described, and is so frequently visited nowadays, that any description of mine would be a repetition of what others have better said.

I will content myself by saying we reached home safely and in admirable health. If I have

been successful enough to combine instruction with amusement, and when the reader puts down the 'Naturalist in North-western America,' after going through its pages, he can say he knows more of that country's Natural History than he did before, I shall have accomplished all my most sanguine anticipations.

APPENDIX.

APPENDIX.

A List of Mammals, Birds, Insects, Reptiles, Fishes, Shells, Annelides, and Diatomaceæ, collected by myself in British Columbia and Vancouver Island, with notes on their habits.

New species, together with those possessing any novel interest, are described in Vol. I. or II.

HERE I think is the proper place to acknowledge the obligations conferred on me by the following gentlemen, without whose valuable aid I could not have determined and described the new species obtained:—

To Dr. E. Gray, first, for immense assistance conferred in his public capacity, and great kindness shown me in his private one.

To Mr. George Gray (British Museum), for valuable help in making out the birds.

To Dr. Baird (British Museum), for description of the new species of shells and annelides, and other valuable help as regards the molluscous groups.

To Mr. Smith (British Museum), for great assistance in determining, naming, and arranging the insects;

and to Mr. Walker, for naming and describing the Coleoptera.

To Dr. A. Gunther (British Museum), for descriptions and much valuable aid in making out the Salmonidae and other fishes collected.

To Professor Bowerbank, F.R.S., for very great kindness in determining and describing two sponges new to science.

To Spence Bates, Esq., for descriptions of the new Crustaceans.

To Mr. E. W. Smith and Mr. Whympere I am indebted for the able illustrations in Vols. I. and II.

List of Mammals.

INSECTIVORA.

- Sorex Trowbridgii.* (Baird.)
- *Suckleyi.* (Baird.)
- *vagrans.* (Cooper.)
- Urotrichus Gibsii.* (Baird.)
- Scalops Townsendii.* (Bach.)

FELIDÆ.

- Felis concolor.* (Linn.)
- Lynx canadensis.* (Raf.)

CANIDÆ.

- Canis occidentalis.*
- *Griseo albus.* (Richd.)
- *rufus.* (Richd.)
- *latrans.*
- *familiaris.*
- Vulpes macrotis.* (Baird.)
- *discussatus.*
- *argentatus.*

MARTINÆ.

- Mustela Pennantii.* (Ersl.)
- *americana.* (Turton.)

- Putorius noveboracensis.* (De Kay.)
- *longicauda.* (Bonapt.)
- *Vison.* (Ard. & Bach.)
- Gulo luscus.* (Ard. & Bach.)

LUTRINÆ.

- Lutra californica.* (Gray.)
- Enhydra marina.* (Licht.)

MELINÆ.

- Mephitis occidentalis.* (Baird.)
- *bicolor.* (Gray.)
- Taxidea americana.* (Baird.)

URSIDÆ.

- Procyon lotor.* (Storr.)
- Ursus horribilis.* (Ord.)
- *cinnamomeus.* (Ord.)
- *americanus.* (Ord.)

RODENTIA.

- Sciurus Hudsonius.* (Pallas.)
- *fossor.* (Peake.)
- *Douglassii.* (Bach.)

Sciurus richardsonii. (Bach.)
Pteromys oregonensis. (Bach.)
 — *alpinus*. (Richd.)
Spermophilus townsendii. (Bach.)
 — *douglassii*. (Richd.)
 — *richardsonii*. (Sabine.)
 — *parryi*. (Richd.)
 — *lateralis*. (Tay.)
Tamias quadrivittatus. (Say.)
 — *townsendii*. (Bach.)
Aretomys prinosus. (Gmelin.)
 — *monax*. (Linn.)
 — *okanaganus*. (King.)

CASTORINÆ.

Aplodontia leporina. (Richd.)
Castor canadensis. (Kuhl.)

GEOMYINÆ.

Thomomys douglassii. (Richd.)
 — *umbrinus*.

SACCOMYINÆ.

Perognathus monticola. (Baird.)

DIPODINÆ.

Jaculus hudsonius.

MURINÆ.

Mus rattus. (Linn.)
Hesperomys austerus. (Baird.)

Hesperomys leucopus. (Leconte.)
 — *boylei*. (Baird.)
Neotoma cinerea. (Ord.)
Arvicola oregoni. (Bach.)

FIBER.

Fiber zibethicus. (Cuvier.)
 — *osoyocensis*. (Lord: *sp. nov.*)

HYSTERICIDÆ.

Erethizon epixanthus. (Brandt.)

LEPORIDÆ.

Lepus californicus. (Gray.)
 — *campestris*. (Bach.)
 — *artemesia*. (Bach.)
Lagomys princeps. (Richd.)
 — *minimus*. (Lord: *sp. nov.*)

CERVINÆ.

Alce americanus. (Jard.)
Rangifer caribou. (And. & Bach.)
Cervus canadensis. (Ersl.)
 — *virginianus*. (Bodd.)
 — *leucurus*. (Doug.)
 — *columbianus*. (Richd.)
 — *macrotis*. (Say.)

CAVICORNINÆ.

Antilocapra americana. (Ord.)
Aplocerus montanus. (Ord.)
Ovis montana. (Cuvier.)

*List of the Birds, with notes of habitat and periods
 of arrival and departure.*

Raptores.

Cathartes aura Vancouver Island, and throughout
 British Columbia.
 — *californianus* Mouth of Fraser River. Seldom
 visits the interior.

<i>Falco nigriceps</i>	.	.	.	.	Sumass Prairie.
— <i>columbaris</i>	.	.	.	.	Vancouver Island, and throughout British Columbia. Migratory.
— <i>sparverus</i>	.	.	.	.	Common in British Columbia. Winters on Vancouver Island.
<i>Astur stricapillus</i>	.	.	.	.	Lake Osoyoos, Shemeelkameen River. Arrives in May; leaves in October.
<i>Accipiter mexicanus</i>	.	.	.	}	Both common east of the Cascades.
— <i>Cooperii</i>	.	.	.		Only summer visitors.
— <i>fuscus</i>	.	.	.		More common on Vancouver Island than either east or west of the Cascades.
<i>Buteo montanus</i>	.	.	.	.	An abundant species. Seen constantly east of the Cascades.
<i>Archibuteo lagopus</i>	.	.	.	.	Sumass and Osoyoos Lakes.
— <i>ferrugineus</i>	.	.	.	.	Seen only at Sumass.
<i>Circus hudsonius</i>	.	.	.	.	Abundant. Arrives in May and June.
<i>Haliaeetus leucocephalus</i>	.	.	.	.	Throughout British Columbia and Vancouver Island. Winters.
<i>Pandion Carolinensis</i>	.	.	.	.	Seen near all lakes and rivers. Winters at the island.
<i>Bubo virginianus</i>	.	.	.	.	Abundant east and west of the Cascades.
<i>Scops asio</i>	.	.	.	.	Rather a rare species. Winters east of the Cascades.
<i>Otus Wilsonianus</i>	.	.	.	.	Common throughout British Columbia.
<i>Brachyotus Cassinii</i>	.	.	.	.	Sumass and Chelukweyuk prairies.
<i>Syrnium cinerum</i>	.	.	.	.	A rare species; shot at Sumass only.
<i>Nyctale acadica</i>	.	.	.	.	Obtained only east of the Cascades.
<i>Surnia ulula</i>	.	.	.	.	Rock Creek, Lake Osoyoos.
<i>Glaucidium gnoma</i>	.	.	.	.	A rare and beautiful little species, but seldom seen. Migratory; arriving at Vancouver Island in May.
<i>Nyctea nives</i>	.	.	.	.	Not unfrequently seen near the entrance to the Fraser River.
<i>Athene cunicularia</i>	.	.	.	.	Seen only east of the Cascades.

Picidae.

<i>Picus Harrisii</i>	.	.	.	.	Vancouver Island, Sumass, Osoyoos. Arrives in May. Winters at Vancouver Island.
— <i>Gairdneri</i>	.	.	.	.	Much as preceding.
— <i>albolarvatus</i>	.	.	.	.	A rare and beautiful species. Obtained only east of the Cascades.
<i>Picoides arcticus</i>	.	.	.	.	Obtained only east of the Cascades.
— <i>hirsutus</i>	.	.	.	.	East and west of the Cascades.
<i>Hylatomus pileatus</i>	.	.	.	.	Common east and west of the Cascades.
<i>Melanerpes torquatus</i>	.	.	.	.	Shot only in the open timbered lands, in British Columbia, east of the Cascades.
<i>Colaptes mexicanus</i>	.	.	.	.	The most abundant of the summer visitors to Vancouver Island and British Columbia.
<i>Sphyrapicus varius</i>	.	.	.	.	Vancouver Island, Sumass, Osoyoos, valley of the Columbia. Both species.
— <i>ruber</i>	.	.	.	.	
<i>Colaptes auratus</i>	.	.	.	.	Seen only at Sumass.
— — (var.) <i>hybridus</i>	.	.	.	.	

Trochilidae.

<i>Trochilus Alexandri</i>	.	.	.	.	Obtained only in the valley of the Columbia.
<i>Stellata Calliope</i>	.	.	.	.	Syniakwateen, and summit of Rocky Mountains, 7,000 feet altitude.
<i>Selasphorus rufus</i>	.	.	.	.	Common on Vancouver Island and throughout British Columbia.

Cypselidae.

<i>Nephocaetes niger</i>	.	.	.	.	Sumass and Fort Colville.
<i>Chaetura Vauxii</i>	.	.	.	.	Sumass only.

Caprimulgidae.

<i>Chordeiles popetue</i>	.	.	.	.	Vancouver Island and throughout British Columbia.
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Alcedinidæ.

Ceryle Alcyon Very abundant.

Tyranninæ.

Tyrannus carolinensis Vancouver Island and throughout
British Columbia. Arrives in
May; leaves in October.

— *verticalis* As preceding.

Sayornis Sayus } All these Flycatchers are found in
Centopus borealis } British Columbia, and some of
— *Richardsonii* } them also visit Vancouver Island;
Empidonax pusillus } arriving in May, and leaving in
— *acadicus* } September and October.
— *flaviventris* }

Turdidæ.

Turdus migratorius } The three species are plentifully
— *naevius* } distributed, reaching Vancouver
— *Pallasii* } Island in May, a little later in
British Columbia. Leave in
October. A few only winter on
the island.

Sialia mexicana } Common on Vancouver Island and
throughout British Columbia.

— *arctica* } Seen only east of the Cascades;
arriving in May; flocking after
nesting; leaving in October.

Regulus satrapa Very plentiful on Vancouver Island
and in British Columbia.

— *calendula* Seen only east of the Cascades.

Hydrobata mexicana Very common on all rivers.

Sylvicolidæ.

Anthus ludovicianus Common on grassy prairies. Shot
it only east of the Cascades, on
the Spokane and Grand Prairies.

<i>Geothlypis trichas</i>	.	.	.	Vancouver Island and British Columbia.
— <i>Macgillivrayi</i>	.	.	.	Vancouver Island and British Columbia. May and October, arrives and departs.
<i>Helminthophaga celata</i>	.	.	.	Syniakwateen.
<i>Dendroica Townsendii</i>	.	.	.	These Warblers have much the same range in Vancouver Island and British Columbia, arriving in May and leaving in October.
— <i>nigrescens</i>	.	.	.	
— <i>coronata</i>	.	.	.	
— <i>Audubonji</i>	.	.	.	
— <i>æstiva</i>	.	.	.	
— <i>maculosa</i>	.	.	.	Much the same as the Warblers. Syniakwateen only.
<i>Myodiocetes pusillus</i>	.	.	.	
<i>Setophaga ruticilla</i>	.	.	.	
<i>Pyranga ludoviciana</i>	.	.	.	Generally distributed, and migratory.

Hirundinidæ.

<i>Cotyle riparia</i>	.	.	.	Much more plentiful east than west of the Cascades. Arrive in May, and leave in September.
— <i>serripennis</i>	.	.	.	
<i>Hirundo horreorum</i>	.	.	.	
— <i>thalassina</i>	.	.	.	
— <i>bicolor</i>	.	.	.	
— <i>lunifrons</i>	.	.	.	

Bombycillidæ.

<i>Ampelis garrulus</i>	.	.	.	Shot only east of the Cascades.
— <i>cedrorum</i>	.	.	.	Common on Vancouver Island, and along the Fraser and Columbia rivers.
<i>Myadestes Townsendii</i>	.	.	.	Very rare. Shot them once only in the Columbia valley.

Laniidæ.

<i>Allyrio borealis</i>	.	.	.	Tolerably abundant.
<i>Aluco olivaceus</i>	.	.	.	Syniakwateen.
— <i>gilvus</i>	.	.	.	Syniakwateen.
— <i>solitarius</i>	.	.	.	Sumass, Vancouver Island, Syniakwateen. All migratory.

Liotrichidæ.

Salpinctes obsoletus	}	Vancouver Island and Sumass. Both migratory.
Thriothorus Bewickii		
Cistotherus palustris		All plentifully scattered about the open timber, and round the edges of prairies. Only summer visitors.
Troglodites Parkmani		
— hyemalis		

Certhiadae.

Certhia americana	The only species found, and not by any means plentiful.
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Sittinae.

Sitta aculeata	}	Much the same distribution, the two latter species being more abundant east of the Cascades.
— canadensis		
— pygmaea		

Paridae.

Parus occidentalis	}	All four species abundant everywhere.
— montanus		
— rufescens		
Psaltiparus minimus		

Alaudidae.

Eremophila cornuta	Sumass, Osoyoos, Vancouver Island, and Grand Prairie.
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Fringillidae.

Hesperiphona vespertina	}	Syniakwateen, valley of the Columbia. Never saw them west of the Cascades.
Pinicola canadensis		
Carpodacus californicus	}	These are all abundant summer residents, on both slopes of the Cascades.
— Cassinii		
Chrysomitris tristis		
— pinus		
Curvirostra americana		
Aegiothus linaria		

<i>Leucosticte tephrocotis</i>	.	.	.	Summits of the Cascades and Rocky Mountains. Very rare. Breeds at an altitude of 7,000 feet above the sea level.
<i>Plectrophanes nivalis</i>	.	.	.	Sumass, Fort Colville.
<i>Passerculus savanna</i>	.	.	.	Common about the prairies and open timbered lands. Arrive in May, leave in September.
— <i>sandwichensis</i>	.	.	.	
<i>Chondestes grammacus</i>	.	.	.	
<i>Zonotrichia Gambellii</i>	.	.	.	
— <i>coronata</i>	.	.	.	The most abundant small bird in British Columbia. Arrives early in May, and leaves in October.
— <i>albicollis</i>	.	.	.	
<i>Junco oregonus</i>	.	.	.	
<i>Spizella monticola</i>	.	.	.	Regular summer visitors.
— <i>socialis</i>	.	.	.	
— <i>Brewerii</i>	.	.	.	
<i>Melospiza rufina</i>	.	.	.	
— <i>Lincolnii</i>	.	.	.	
<i>Passerella Townsendii</i>	.	.	.	
<i>Cyanocephalus amoenus</i>	.	.	.	

Icteridæ.

<i>Agelaius phoeniceus</i>	.	.	.	Abundant in some localities only during the flocking, after nesting.
<i>Molothrus pecoris</i>	.	.	.	
<i>Sturnella neglecta</i>	.	.	.	
<i>Icterus Bullockii</i>	.	.	.	
<i>Scolecophagus cyanocephalus</i>	.	.	.	

Corvidæ.

<i>Cervus americana</i>	.	.	.	For description of habits, see chapter on Crows, Vol. II.
— <i>carnivorus</i>	.	.	.	
— <i>caurinus</i>	.	.	.	
<i>Picicorvus columbianus</i>	.	.	.	
<i>Pica hudsonica</i>	.	.	.	
<i>Cyanura Stelleri</i>	.	.	.	
<i>Perisoreus canadensis</i>	.	.	.	

Columbidae.

<i>Ectopistes migratoria</i> . . .	.	.	.	} Never seen in large flocks. Arrive in May, and leave in October.
<i>Columba fasciata</i> . . .	.	.	.	
<i>Zenaidura carolinensis</i> . . .	.	.	.	

Tetraonidae.

<i>Tetrao obscurus</i> . . .	.	.	.	} Vide chapter on Game Birds, Vol. II.
— <i>Franklinii</i> . . .	.	.	.	
<i>Centrocercus urophasianus</i> . . .	.	.	.	
<i>Pediocaetes phasianellus</i> . . .	.	.	.	
<i>Bonasa Sabinii</i> . . .	.	.	.	
<i>Lagopus rupestris</i> . . .	.	.	.	

Gruidae.

<i>Grus canadensis</i> . . .	.	.	.	Very common east and west of the Cascades.
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Ardeidae.

<i>Ardea herodias</i> . . .	.	.	.	} Sumass prairies, Vancouver Island, and streams east of the Cascades, Osoyoos Lakes.
<i>Botaurus lentiginosus</i> . . .	.	.	.	

Charadriidae.

<i>Aegialitis vociferus</i> . . .	.	.	.	Common throughout British Co- lumbia.
<i>Squatarola helvetica</i> . . .	.	.	.	Not at all plentiful. Seen usually on the mud flats at low tide.
<i>Aphriza virgata</i> . . .	.	.	.	Rare. Frequents rocks along the sea-coast. Shot it at Nainimo and Fort Rupert.

Haematopodidae.

<i>Haematopus palliatus</i> . . .	.	.	.	} Common on the rocks in Esquimalt Harbour.
<i>Streptopelia melanocephalus</i> . . .	.	.	.	

Phalaropodidæ.

- Phalaropus hyperboreus* . . . In most streams east of the Cascades. I also shot it in Esquimalt Harbour.

Scolopacidæ.

- Gallinago Wilsonii* . . . Not very plentiful. Langley, Summass, Osoyoos.

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|----------------------------------|---|---|---|--|
| <i>Macrorhamphus scolopaceus</i> | . | . | . | } Most of these breed in British Columbia, arriving in May and leaving in October. |
| <i>Tringa subarquata</i> | . | . | . | |
| — <i>alpina</i> | . | . | . | |
| — <i>maculata</i> | . | . | . | |
| — <i>Bonapartii</i> | . | . | . | |
| — <i>Wilsonii</i> | . | . | . | } Arrive and breed as the above. |
| <i>Ereunetes petrificatus</i> | . | . | . | |
| <i>Tringoides macularia</i> | . | . | . | |
| <i>Gambetta flavipes</i> | . | . | . | |
| <i>Heteroscelus brevipes</i> | . | . | . | |
| <i>Numineus longirostris</i> | . | . | . | } Vide Vol. II. |
| <i>Arctiturus Bartramius</i> | . | . | . | |
| <i>Tringites rufescens</i> | . | . | . | } All three breed at the Osoyoos Lakes. |
| <i>Limosa fedoa</i> | . | . | . | |
| <i>Fulica americana</i> | . | . | . | |

Cygninæ.

- Cygnus americanus* . . . } Common throughout British Columbia.
 — *buccinator* . . . }

Anserinæ.

- Anser hyperboreus* . . . }
 — *Gambellii* . . . } Vide Vol. II.
Bernicla canadensis . . . }
 — *Hutchinsii* . . . }

Anatinæ.

- Anas boschas* . . . }
Defila acuta . . . } Common both on the coast and on
Nettion carolinensis . . . } lakes and rivers inland.
Querquedula discors . . . }

<i>Querquedula cyanoptera</i>	.	.	.	.	.
<i>Spatula clypeata</i>	.	.	.	.	.
<i>Aix sponsa</i>	.	.	.	.	.
<i>Chaulelasmus streperus</i>	.	.	.	.	.
<i>Mareca americana</i>	.	.	.	.	.
<i>Fulix marila</i>	.	.	.	.	.
— <i>affinis</i>	.	.	.	.	.
— <i>collaris</i>	.	.	.	.	.
<i>Athya americana</i>	.	.	.	.	.
— <i>vallisneria</i>	.	.	.	.	.
<i>Bucephala americana</i>	.	.	.	.	.
— <i>islandica</i>	.	.	.	.	.
— <i>albeola</i>	.	.	.	.	.
<i>Histrionicus torquatus</i>	.	.	.	.	.
<i>Harelda glacialis</i>	.	.	.	.	.
<i>Melanetta velvetina</i>	.	.	.	.	.
<i>Pelionetta perapicillata</i>	.	.	.	.	.
<i>Oidemia americana</i>	.	.	.	.	.
<i>Erismatura rubida</i>	.	.	.	.	.
<i>Mergus serrator</i>	.	.	.	.	.
<i>Lophodytes cucullatus</i>	.	.	.	.	.

Regular visitors.

Diomedeinæ.

<i>Diomedea brachyura</i>	.	.	.	.	.
— <i>fuliginosa</i>	.	.	.	.	.

Common in Puget's Sound, and in the Gulf of Georgia.

Laridæ.

<i>Larus glaucescens</i>	.	.	.	.	.
— <i>argentatus</i>	.	.	.	.	.
— <i>occidentalis</i>	.	.	.	.	.
— <i>californicus</i>	.	.	.	.	.
— <i>delawarensis</i>	.	.	.	.	.
— <i>Suckleyi</i>	.	.	.	.	.
<i>Blasius Heermanni</i>	.	.	.	.	.
<i>Chroicocephalus Philadelphia</i>	.	.	.	.	.
<i>Rissa septentrionalis</i>	.	.	.	.	.

All found along the coast, and in the Gulf of Georgia.

Pellicanidæ.

<i>Pellicanus erythrorhyncus</i>	.	.	.	.	.
— <i>fuscus</i>	.	.	.	.	.

Rather rare. Found in Puget's Sound; and the former at their breeding grounds at the Klamath Lakes.

Phalacrocoracidae.

Graculus cilophus	)	All abundant about Fort Rupert.
— violaceus	)	
Colymbus septentrionalis	)	
— torquatus	)	

Podicipinae.

Podiceps cornutus	)	Common in all inland lakes and streams.
— cristatus	)	
— griseigena	)	
— occidentalis	)	
Podilymbus podiceps	)	

Alcidae.

Mormon cirrhata	)	Found in the Gulf of Georgia. Breed on the islands.
Cerorhina monocerata	)	
Uria columba	)	

REPTILES.

ORDER I. CHELONIA—TURTLES.

ACTINEMYS MARMORATA. (Agass.)

The Western Pond Turtle.

I obtained these turtles at Walla-walla in the month of June. They had left the streams, and were wandering about in the grass to deposit their eggs. Apart from the egg season, it is a most difficult matter to catch them. I have seen them in nearly every lake and pool east and west of the Cascades. They are also common on Vancouver Island.*

* Vide Vol. I.

ORDER II. SAURIA—THE LIZARDS.

ELGARIA PRINCIPIS. (Baird and Girard.)

Spotted Elgaria.

I obtained specimens of this lizard at Walla-walla and on the banks of the Chelukweyuk river. I found it in both cases under stones, in turning them over to hunt for beetles. Dr. Suckley records it as being found west of the Cascade range, but I never met with it; I should not say that it was by any means an abundant species.

PHRYNOSOMA CORNUTUM. (Gray.)

This species is much larger than *Tapaya Douglassii*, and has a much more extensive geographic range. The specimens I brought home were obtained on the open sandy plains laying north of the Klamath lakes—these plains appear to be its limit north, beyond this *Tapaya Douglassii* replaces it—and also on the sunny hill sides at Colville. Whether it is to be found along the coast range, or west of the Cascade mountains, I am not sure; at any rate I never saw it there. Its colour very nearly approximates the basaltic piles, in the cracks of which it lives.

TAPAYA DOUGLASSII. (Girard.)

The Oregon Horned Toad.

I never saw this singular looking lizard on the west slope of the Cascades, but they abound on the sand

plains on each side of the Columbia river; * I also saw them on the Tobacco plains, between the Kootanie river and the Galton mountains, and in the Flathead valley, which is about 4,199 feet above the sea level. They live on the dry sandy plains, and run so much like a mouse that I have often been deceived, and taken them for small mammals. They live in holes generally at the roots of a wild sage (the *Artemesia*) bush, and are perfectly harmless, although their looks sadly belie them. I have frequently taken them in my hand, and they neither bite or attempt to use their spines for defensive purposes. I obtained another species, much larger than this, on the sand plains near the Klamath Lakes, that does not appear to range as far north as this smaller species.—Vide *P. cornutum*.

OPHIDIA—THE SERPENTS.

CROTALUS LUCIFER. (Baird and Girard.)

The Western Rattlesnake.

The Rattlesnake, I believe I may safely say, is never found west of the Cascade range, neither is it in any great abundance north of the Columbia river; but at the Dalles, the Snake, Pelouse, and Spokane rivers, indeed I may say at every station along the entire Bndy. Line, and high up on the slopes of the Rocky Mountains its name is *legion*. I have often, when climbing a sunny hill-side, seen a rattlesnake coiled up on nearly every ledge and flat-lying stone. Specimens obtained at different localities vary very much in colour, both in the ground colour and mark-

* Vide Vol. II.

ings; and I am inclined to think the marking and general hue of the snake depends in a great degree on the nature of the rocks, or colour of the ground whereon it lives.

I never once saw the rattlesnake attempt to spring at or attack either man, dog, or horse. I have again and again teased a large rattlesnake with a twig, but never succeeded in provoking to attack me. Very sluggish in all its movements, and remarkably fond of creeping in the dust.

The Indian women use the rattle of the snake, both on the east and west side of the Rocky Mountains, either to produce abortion, or, as ergot of rye (*Secale cornutum*), is used by physicians to produce uterine contraction. The rattle has evidently some specific effect on the uterine tissues. I do not think there is more than one species west of the Rocky Mountains.

BASCANION VETUSTUS. (Baird and Girard.)

The Green Racer.

This snake I obtained at Sumass and Chelukweyuk prairies, and along the Bndy. Line east of the Cascades. Its favourite haunt appears to be in the thin brush skirting the edges of open prairie land, and the principal part of its time in the summer appears to be passed in the bushes, up the stems of which it climbs with great ease and celerity; when there, it lazily basks away its time coiled round a branch. I suspect tree frogs and insect larvæ constitute its usual food.*

* Vide Vol. I.

WENONA PLUMBEA. (Baird and Girard.)

The Wood Snake.

Not at all uncommon on the Sumass and Chelukweyuk prairies; frequents dark shady spots, or long grass round the edges of pools. I never met with any east of the Cascades.

WENONA ISABELLA. (Baird and Girard.)

Much the same in habits and distribution as the above; common in the woods along the bank of the Chelukweyuk river. Both these snakes are also found on Vancouver Island.

BATRACHIA.

ANOURA (TAILLESS BATRACHIANS).

BUFO BOREAS. (Baird and Girard.)

This toad is common east and west of the Cascades, on the Sumass and Chelukweyuk prairies, in the valley of the Columbia, and on the Spokane prairies; fond of lurking in damp, dark underbrush and long grass found also on Vancouver Island.

BUFO COLUMBIENSIS.

The Columbian Toad.

Very common along the banks of the Columbia, and extending up the western slopes of the Rocky Mountains; fond of damp shady situations, especially the wooded edges of pools and lakes; in the summer time it frequently goes into the water.

There are two or three specimens of snakes I brought home not yet made out, which will perhaps be found to be new species.

EUTAINIA PICKERINGII. (Baird and Girard.)

Pickering's Garter Snake.

This snake I found on the Sumass and Chelukweyuk prairies, as well as along the entire course of the Bndy. Line to the Rocky Mountains. I also saw it in California and Oregon.

They come out of their winter sleeping places in May, and then lay about the edges of the brush, lazily sunning themselves. About a month later coupling time arrives, when they get near the water, and are usually seen in small groups. In the hot summer weather they spend nearly the whole of their time in the water. They are quite harmless, and feed principally on small Batrachians and insects.

EUTAINIA LEPTOCEPHALA. (Baird and Girard.)

The Small-headed Striped Snake.

The same remarks apply to this as *E. Pickeringii*.

EUTAINIA VAGRANS. (Baird and Girard.)

The Large-headed Striped Snake.

The same range and habits as the two preceding species.

EUTAINIA CONCINNA.

The One-striped Garter Snake.

Not so common on the west of the Cascades as the preceding species of Garter snakes, but I saw it at

Sumass, and on the trail that crosses the Cascade range from Fort Hope to Colville.

All the Garter snakes found along the course of Bndy. Line are very similar to each other, not only in habit but in the distribution of the markings; all are harmless, and may be handled with impunity.

PETUOPHIS WILKESII. (Baird and Girard.)

Oregon Bull Snake.

This snake attains a much larger size than any other species in this district; I have frequently seen them three or four feet long. The snake is common on both sides of the Cascades; in the spring it keeps on the grassy prairie land, but in the hot weather retires to the shores of lakes and ponds, or the margins of streams, and spends much of its time in the water. Although quite harmless, it assumes a most menacing attitude when suddenly surprised on the open plain, curling itself up into a spiral, and hissing furiously. I obtained one very large specimen near Colville, another at Sumass, and a third near the foot of the Galton Mountains. I never saw it on Vancouver Island, although I think it is very likely that it lives there in the open valley land.

I obtained another species of Petuophis, but it has not yet been determined or named.

ELGARIA GRANDIS. (Baird and Girard.)

Banded Elgaria.

I obtained this beautiful lizard at the Blacksmith's Camp, on the Chelukweyuk river; I also saw it at

Walla-walla on the banks of the Columbia. The hot sandy plains about Walla-walla seem to be a favourite haunt for several species of lizards. The wild sage grows about in tufts or patches, and under the roots live the lizards: the sand is covered with their tracks; they are so sharp and active that it is very difficult to catch them.

SCELOPORUS OCCIDENTALIS.

Western Fence Lizard.

This lizard is very common on the sand plains along the banks of the Columbia river. I also obtained it at Colville (altitude above sea level 1,268 feet). I never saw it west of the Cascades, although Dr. Suckley mentions it as being found at Steilacum. Its habit is to frequent dead timber and to hide under stones and fallen logs; it often climbs into the pine trees, and all its motions are very agile and graceful.

SCELOPORUS GRACIOSUS. (Baird and Girard.)

Slender Fence Lizard.

This lizard is very common on the large masses of basaltic rocks* that start up like ogres' castles on the sand plains between Walla-walla and Colville. I saw a great many of them at the Snake river ferry, on the rocks about the Pelouse river.

URADELA (TAILED BATRACHIANS).

TARICHA TOROSA. (Gray. Cat. Brit. Mus. 11-1656, p. 25.)

The Warty Salamander.

A widely-distributed species found east and west of the Cascades, and on the western slope of the Rocky

* Vide Vol. II.

Mountains; its haunts are in dark damp situations, where it remains for hours on a log or a stone perfectly still; when in motion its mode of progression is slow and lazy. I believe it passes the winter buried deeply in the sand or in damp earth banks. I saw a salamander that I imagine was this species (but did not obtain it) on Ptarmigan hill* near some running water; this was late in the year (October), and 7,000 feet above the sea level. I also obtained specimens at Sumass and Colville.

LIST OF COLEOPTERA.

The new species are distinguished by an *.

GEODEPHAGA. (Mac Leay.)

CICINDELIDÆ.

Cicindela. (Linn.)
vulgaris.

CARABIDÆ.

Elaphrus. (Fabr.)
intermedius. (Kirby.)
Calosoma. (Weber.)
*irregulare. (Walk.)
Callisthenes.
*pimeloides. (Walk.)
Carabus. (Auct.)
*bicolor. (Walk.)
Cychrus. (Fabr.)
angusticollis. (Eschs.)
tuberculatus. (Harris.)
Chlenius. (Bon.)
sericeus. (Dej.)
Agonum. (Bon.)
seminitidum.
Pterostichus. (Auct.)
*calligatus. (Walk.)
validus. (Lec.)
similis. (Kirby.)

Amara. (Bon.)

*extensa. (Walk.)
communis.

HARPALIDÆ.

Anisodactylus. (Dej.)
californicus.
Harpalus. (Latr.)
*defixus. (Walk.)

BEMBIDIIDÆ.

Bembidium. (Latr.)
*æqualis. (Walk.)

HYDRADEPHAGA. (Mac Leay.)

Dytiscus. (Linn.)
Ooligbukii. (Kirby.)
Acilius. (Leach.)
semisulcatus. (Aubé.)
Hydaticus. (Leach.)
zonatus. (Koppe.)
Tropisternus. (Sol.)
*binotatus. (Walk.)
Laccophilus. (Leach.)
maculosus. (Linn.)

* Vide Vol. I.

BRACHELYTRA.

ALCOCHARIDÆ.

Atemeles. (Dill.)**reflexa.* (Walk.)

STAPHYLIMIDÆ.

Creophilus. (Kirby.)
villosus.

MECROPHAGA.

SILPHIDÆ.

*Microphorus.**Melsheimeri.* (Kirby.)**conversator.* (Walk.)

HISTERIDÆ.

Saprinus. (Erich.)**consimilis.* (Walk.)**fimbriatus.**Trogosita.* (Oliv.)*mauritania.* (Linn.)*virescens.* (Fabr.)

DERMESTIDÆ.

Dermestes. (Linn.)*lardarius.* (Linn.)

CUCUJIDÆ.

*Cucujus.**punicus.* (Mann.)

HYDROPHILIDÆ.

Hydrous. (Leach.)*triangularis.* (Say.)*Philhydrus.* (Sol.)**lividus.* (Walk.)

LAMELLICORNES.

CETONIDÆ.

*Cremastochilus.***armatus.* (Walk.)

RUTELIDÆ.

Anomala. (Köppe.)**contermina.* (Walk.)*Ancylonica.***nigropicea.* (Walk.)**consequens.* (Walk.)**uninotata.* (Walk.)

MELOLONTHIDÆ.

*Rhizotrogus.***collocatus.* (Walk.)*Serica.* (Mac Leay.)**crassata.* (Walk.)*Melolontha.**decemlineata.* (Say.)

COPRIDÆ.

Coprobius. (Latr.)*simplex.* (Lec.)

EUPHURUS.

subterraneus.

BUPRESTIDÆ.

*Dircea.**tuberculata.* (Harris.)*Chalcophora.* (Sol.)*angulicollis.* (Lec.)*Ancylocheira.* (Eschs.)*rusticorum.* (Kirby.)*aurulentum.***ornata.* (Walk.)*Trachypteria.**prasina.* (Lec.)*decolorata.* (Lass. & Gar.)

ELATERIDÆ.

*Alaus.***luscus.* (Fabr.)*Adelocera.***vetusta.* (Walk.)*Athous.* (Eschs.)**vittatus.* (Walk.)*Sclatosomus.***semimetallicus.* (Walk.)*Limoniis.* (Eschs.)**consimilis.* (Walk.)

CLERIDÆ.

Clerus.*sobrius*. (Walk.)*nubilus*. (Klug.)*Corynetes*. (Herbst.)*violaceus*. (Fabr.)

HETEROMERA.

BLAPTIDÆ.

Eleodes. (Eschs.)**convexicollis*. (Walk.)**conjuncta*. (Walk.)**latiuscula*. (Walk.)**subtuberculata*. (Walk.)*caudata*. (Sol.)**binotata*. (Walk.)

CONIOTIDÆ.

Coniontis ovalis. (Eschs.)

CELOMETOPIDÆ.

Calocnemis.*californica*? (Mann.)*dentipes*. (Esch.)

TENEBRIONIDÆ.

Iphthinus.**servilis*. (Walk.)**servator*. (Walk.)**subligatus*. (Walk.)

MELOIDÆ.

Lytta.**immerita*. (Walk.)*vesicatoria*. (Linn.)*Nemognatha*.**bicolor*. (Walk.)

HELOPIDÆ.

Helops.**inclusus*. (Walk.)*Eusattus*. (Lecont.)*muricatus*. (Lec.)

RHYNCHOPHORA.

ATTELABIDÆ.

Rhynchites. (Herbst.)**congrua*. (Walk.)

LONGICORNES.

PRIONIDÆ.

Prionus. (Geoff.)*pocularis*. (Dahl.)*Macrotoma*.*spiculigera*. (White.)*Spondylus*.*apiformis*.

CERAMBYCIDÆ.

Clytus. (Fabr.)*Sayi*. (Lory.)*Eriocephalus*.*productus*. (Lec.)

LAMIADÆ.

Monohammus.*clamator*. (Lec.)*resutor*. (Kirby.)*Eutrypanus*.**princeps*. (Walk.)

LEPTURIDÆ.

Trypocerus.**cervinus*. (Walk.)*Leptura*.*annulata*. (Lory.)*chrysocoma*. (Kirby.)*Torotus*.**perductor*. (Walk.)*Pachyta*.*litura*.*sexmaculata*.*Graptodera*.*plicapennis*.*Cryptocephalus*.**bisignatus*. (Walk.)*Chelymormpha*.*Argus*.

ORDER. COLEOPTERA.

Fam. CARABIDÆ. (Mac Leay.)—Genus CALOSOMA.
(Weber.)

Calosoma irregulare. N. S.

Æneo-nigrum, capite antico ruguloso, thorace subiliter ruguloso, stria media, lateribus retusis valde convexis; elytris rugosis lineis sex e punctis auratis punctis, submarginalibus auratis minoribus.

Æneous black; black beneath. Head rugulose in front, with an impression and a retuse border on each side. Thorax more finely rugulose than the head, with an impressed middle line, retuse and very convex along each side. Elytra less finely rugulose than the head; each with three discal lines of gilded points, and with a submarginal line of more minute gilded points. Length of the body, 12 lines.

This species has no regular striated lines on the elytra, and is therein quite different from *C. calidum* and from *C. frigidum*. It is allied to the Siberian *C. denticella* and to two species from California and Vancouver Island.

Genus CALLISTHENES. (Fischer.)

Callisthenes pimelioides. N. S.

Nigra, brevis, lata, obscura, subtilissime punctata; capitis lateribus retusis, excavatis, disco antico sublevi; thorace lateribus subconvexis, subretusis, atria media tenui; elytris lineis pustularibus lateribus valde rotundatis.

Calosoma black, short, broad, thick, dull. Head and thorax very finely and thickly punctured. Head in front, with an almost smooth disc, and a retuse and excavated border on each side. Thorax slightly convex and retuse along each side, narrower hindward, with a slight impressed middle line. Elytra very convex on each side; each with about seventeen lines of minute pustules. Length of the body, 8 lines.

It is somewhat allied to an undescribed *Callisthenes* from California, but is quite distinct.

Genus CARABUS. (Linn.)

Carabus bicolor. N. S.

Niger, *breviusculus*, *subtilissime punctatus*; *thorace stria media bene determinata*; *lateribus subconvexis*, *angulis posticis productis*; *elytris cupreis lineis sex e pustulis elongatis nigris*; *lateribus subconvexus*.

Black, rather short. Head and thorax very minutely punctured, the former with the usual impression on each side in front. Thorax with an impressed distinctly marked middle line; sides slightly convex; hind angles produced, extending over the fore border of the elytra. Elytra cupreous; each with three lines of elongated black pustules, and with a submarginal line of minute impressions; sides slightly convex. Length of the body, 8 lines.

This belongs to the group of *C. ligatus* and of *C. Mæander*, which it resembles in the sculpture of the elytra.

Fam. FERONIIDÆ. (De Laporté.)—*Genus OMASEUS.*
(Zeigler.)

Omaseus colligatus. N. S.

Fœm. niger, nitens; thorace postice subcontracto sulco transverso antico excavato stria media striis duabus lateralibus parvis margine postico ruguloso; elytris obscuris striatis punctis octo impressis lineis duabus submarginalibus punctularibus lateribus subapicalibus subexcavatis.

Female.—Black. Head and thorax shining, almost smooth. Head in front with a slight transverse impressed line, and with two broad longitudinal minutely-punctured furrows. Thorax slightly contracted hindward, rugulose along the hind border, with a curved transverse impressed line in front, with a distinct middle impressed line, and with two short impressed lines which extend to one-third of the length from the hind border. Elytra dull; each with eight longitudinal lines, with a row of slight submarginal excavations, and with four punctures—first, third, and fourth punctures, on the third line; second puncture, on the second line; exterior border, with a very slight subapical excavation. Length of the body, 7 lines.

Genus AMARA. (Bonelli).

Amara extensa. N. S.

Nigra, capite foveolis duabus e linea transversa impressa connexis; thorace stria tenui postice subtiliter ruguloso sulculis duobus lateralibus; elytris elongatis

subobscuris lineis bene determinatis, palpis tarsisque piceis, antennis basi rufis.

Black, smooth, shining. Head in front with two slight discal impressions, which are connected by a slight transverse impressed line. Thorax slightly broader hindward, with a slight impressed line; space along the hind border minutely rugulose, with two short broad longitudinal furrows. Elytra elongate, slightly dull; each with eight distinctly marked lines, and with minute punctures along the exterior border. Palpi and tarsi piceous. First and second joints of the antennæ red. Length of the body, 4 lines.

This species has a somewhat narrower body and more elongated thorax than *A. vulgaris*, which also inhabits North America.

AMARA COMMUNIS. (Gyllenhahl.)

Ænea, nitens, capite stria transversa antica stria media foveolisque duabus lateralibus posticis; elytris striatis ex parte nigricante æneis.

Æneous, smooth, shining. Clypeus, antennæ, legs and underside black. Head with a transverse impressed line in front. Thorax with a slight impressed line, and on each side, with a slight impression near the hind border, at half the distance between the line and the exterior border. Elytra partly blackish æneous, with the usual eight longitudinal lines on each, and with impressions along the exterior border. Length of the body, 3 lines.

This species agrees exactly with the European *A. communis*. In sculpture it comes between *A. lævi-*

pennis and *A. discors* of British North America, and the elytra are somewhat shorter than those of *A. californica*.

Fam. HARPALIDÆ. (Mac Leay.)—Genus HARPALUS.
(Latr.)

Harpalus defixus. N. S.

Niger, nitens, antennis rufescentibus; thorace stria antica media, striæque media tenuissimis spatio postico ruguloso sulculis duobus lateralibus, elytris striatis.

Male black, smooth, shining; antennæ reddish; thorax slightly excavated in the disc on each side hindward; very slightly rugulose along the hind border, with a longitudinal impressed line, and in front with a transverse impressed line, both extremely slight. Each elytron with nine impressed lines. Tibiæ and tarsi piceous. Length of the body, $4\frac{3}{4}$ lines.

Closely allied to *H. æneus*. The sides of the thorax are less rounded than those of *H. interpunctatus*, *rotundicollis*, *laticollis*, and *carbonarius* of British North America, and it is very distinct from other North American species, such as *H. pleuriticus*, *H. basilaris*, and *H. ochropus*.

Fam. BOMBIDIIDÆ. (Staph.)—Genus PERYPHUS.
(Megerle.)

Peryphus æqualis. N. S.

Subæneo viridis; capite antico bisulcato; palpis, antennis, pedibusque nigris; thorace stria media margine postico bifo violato; elytris striatis punctis duobus impressis.

Green, slightly tinged with æneous. Head with a longitudinal furrow on each side in front; palpi, antennæ, and legs black. Thorax with an impressed middle line, and with an impression on each side by the hind border. Elytra with distinctly marked impressed lines, and with two punctures on the third line from the interior border. Length of the body, $3\frac{1}{2}$ lines.

Quite distinct from the American *P. sordidus* and *P. scapularis*.

Fam. DYTICIDÆ. (Leach.)—*Genus LÆCOPHILUS.*
(Leach.)

Læcophilus maculosus. N. S.

Piceus; capite thoraceque obscure; ochraceis elytris vittis duabus marginalibus ochraceis postice abbreviatis et flexis, punctis duobus posticis marginalibus ochraceis; abdomine ochraceo; pedibus obscure ochraceis.

Piceous, smooth, shining. Head and thorax mostly dark ochraceous. Elytra with two ochraceous stripes, which widen from the base along full half the length of the exterior border, and are there bent, and terminate in a short streak towards the disk; two hindward marginal ochraceous points on each elytron. Abdomen ochraceous. Legs dark ochraceous. Length of the body, 3 lines.

It also inhabits the northern states of America.

Fam. ALEOCHARIDÆ. (Leach.)—*Genus ATEMELES.*
(Dillwyn.)

Atemeles reflexus. N. S.

Ferrugineo rufus, latus; antennis piceis basi ferru-

gineo rufis incrassatis; thoracis lateribus valde dilatatis; femoribus latis; tibiis subarcuatis; tarsis setosis.

Ferruginous red, broad. Antennæ piceous, shorter than the body; first joint ferruginous red, incrassated. Thorax much dilated on each side; hind angles prominent, rounded; elytra smooth, shining, covering almost one-third of the length of the abdomen. Legs moderately long; femora broad; tibiæ slightly curved; tarsi setose. Length of the body, $2\frac{1}{2}$ lines.

Fam. HYDROPHILIDÆ. (Leach.)—*Genus TROPISTERNUS.*
(Solier.)

Tropisternus binotatus. N. S.

Cupreo-niger, viridi subnitens; capitis lateribus anticis ochraceis; thorace vittis duabus latis marginalibus ochraceis, maculas duas nigrocupreas includentibus; elytris vittis duabus marginalibus ochraceis postice attenuatis intus excavatis, pedibus piceis.

Cupreous black, elliptical, partly and slightly tinged with green. Antennæ underside black. Head dark ochraceous along each side in front. Thorax with two broad marginal dull ochraceous stripes, each with an oblong oblique cupreous black spot near the hind border. Elytra bordered with dull ochraceous along the sides of the scutellum and along the exterior border; the two stripes are attenuated hindward, and are irregular and excavated on the inner side. Legs piceous. Length of the body, 6 lines.

It is especially distinguished from the other North and South American species by the black mark on each side of the thorax.

Genus PHILYDRUS. (Solier.)

Philydrus lividus. (Forster.)

Luridus, ellipticus, subtilissime punctatus; thorace nigricante subnebuloso; elytris lineis nigricantibus valde indistinctis.

Lurid, shining, elliptical, extremely minutely punctured. Head with a black band along the hind border. Thorax slightly clouded with blackish. Elytra with regular but very minute and indistinct blackish lines. Length of the body, $2\frac{3}{4}$ lines.

There is no perceptible difference between this species and the European specimens of *Philydrus lividus*.

Fam. HISTERIDÆ. (Leach.)—Genus SAPRINUS.
(Erichson.)

Saprinus consimilis. N. S.

Ater, glaberrima; capite, thoracis lateribus, elytrisque postice subtilissime punctatis; elytris striis octo subobliquis subtilissimis postice abbreviatis, abdomine subtilissime punctato.

Deep black, very smooth and shining. Head, sides of the thorax, and elytra, excepting the fore disk, less shining, and very minutely punctured. Each elytron with four slightly oblique, finely impressed lines, which extend from the base to a little beyond the middle. Abdomen very finely and minutely punctured, extending very much beyond the elytra. Length of the body, $2\frac{3}{4}$ lines.

Nearly allied to *S. assimilis*, but the body is rather narrower, and the borders of the elytra are less rounded.

Fam. SILPHIDÆ. (Leach.)—Genus NECROPHORUS.
(Fabr.)

Necrophorus conversator. N. S.

Niger, obscurus; subtiliter punctatus; capite nitente, subtilissime punctato sulcis duobus, postice connexis; thorace marginibus latis subreflexis; elytris maculis sex ochraceis.

Black, dull, thickly and minutely punctured. Head shining, very minutely punctured, with two furrows, which converge, and are connected hindward. Thorax with a broad and slightly elevated rim; transverse line in front, and longitudinal line distinctly impressed. Elytra with six ochraceous spots, of which four form an interrupted band before the middle, and the other two are near the hind border. Abdomen extending much beyond the elytra; four segments uncovered. Length of the body, 9 lines.

It is quite distinct from the North American *N. hebes*, *obscurus*, *Hallii*, *Melsheimeri*, *pygmaeus*, and *velutinus*. In the markings of the elytra it resembles *N. defodiens*, but the scutellum is much smaller.

Fam. ATONIDÆ. (Mac Leay.)—Genus CREMASTOCHEILUS.
(Knoch.)

Cremastocheilus armatus. N. S.

Niger, aspere punctatus; capite bicornutos; thoracis angulis posticis valde productis; elytris litura basali pallida; femoribus tibiisque valde dilatatis.

Black, dull, roughly punctured. Head deeply retuse in front, with an acute projection on each side in front

of the eye. Thorax with the four angles smooth, much produced and very prominent, the hind angles especially so. Elytra broader than the thorax, and a little more than twice its length; each with a pale basal mark. Abdomen with a protuberance on each side at the tip; apical segment vertical. Femora and tibiæ punctured, much dilated. Length of the body, 6 lines.

It may be distinguished from *C. mexicanus* by the much more protuberant hind angles of the thorax, and by the pale mark at the base of the elytra.

Genus ANOMALA. (Köppe.)

Anomala? *contermina*. N. S.

Badia, subtiliter punctata; capite, thorace, pectoreque cano pilosis; abdomini ochraceo; elytris pallide cervinis cano subpubescentibus.

Chestnut colour, finely punctured. Head, thorax, and pectus clothed with hoary hairs. Clypeus retuse. Thorax broadest across the hind border, which is slightly convex; sides convex. Abdomen ochraceous. Elytra pale fawn colour, with thin hoary pubescence, broader than the thorax, and about thrice its length. Length of the body, 5 lines.

Fam. MELOLONTHIDÆ. (Mac Leay.)—Genus RHIZOTROGUS.
(Latr.)

Rhizotrogus collocatus. N. S.

Badius, subtiliter punctatus; thoracis lateribus abdominis marginibus pedibusque fulvo pilosis; elytris striis paucis indistinctis.

Chestnut brown, finely punctured, a little paler beneath. Clypeus with a retuse transversely semi-elliptical border. Sides of the thorax, borders of the abdomen, and legs with long tawny hairs. Thorax much broader hindward than in front; sides convex. Elytra with a few indistinct striæ, broader than the thorax, and more than thrice its length. Length of the body, 8 lines.

Genus ANCYLONYCHA. (Dejean.)

Ancylonycha nigropicea. N. S.

Nigricante picea; capite, thorace confertim et subtiliter punctata; thoracis lateribus convexis; elytris punctato lineatis.

Blackish piceous, thickly and finely punctured. Clypeus short, slightly retuse, slightly excavated in front. Thorax broadest along the hind border; sides convex. Elytra with numerous lines of punctures, broader than the thorax, and about four times its length. Abdomen very finely punctured, projecting a little beyond the elytra. Length of the body, $8\frac{1}{2}$ lines.

Ancylonycha consequens. N. S.

Obscure picea; pectore, abdomine, antennis, pedibusque piceis; capite thoraceque confertissime punctatis; thoracis lateribus convexis; elytris punctato lineatis.

Dark piceous. Underside, antennæ, and legs piceous. Head and thorax very thickly punctured. Clypeus slightly impressed in front. Thorax much broader than the head; sides convex. Elytra with regular lines of punctures, a little broader than the thorax, and about

thrice its length. Abdomen projecting very little beyond the elytra. Length of the body, $5\frac{1}{2}$ lines.

This species is very nearly allied to the preceding one, but may be distinguished by its smaller size, its more thickly punctured head and thorax, and its shorter elytra.

Ancylonycha uninotata. N. S.

Badia; capite thoraceque confertim punctatis; thoracis disco subimpresso; pectore pilis fulvis dense vestito; elytris subcarinatis subtiliter punctatis et rugulosis.

Chestnut colour. Head and thorax thickly punctured. Clypeus very slightly excavated in front. Thorax with a small and slight excavation in the disk. Pectus thickly clothed with long tawny hairs. Elytra minutely punctured and rugulose, with four slight ridges, but not with lines of punctures, full thrice the length of the thorax. Abdomen thinly punctured, extending somewhat beyond the elytra. Length of the body, 10 lines.

Genus SERICA. (Mac Leay.)

Serica crassata. N. S.

Nigra, brevis, lata, crassa, obscura; subtilissime punctata; antennis pedibusque piceis; elytris striatis.

Black, short, broad, thick, dull, very minutely punctured. Clypeus with a slightly retuse border. Antennæ and legs piceous. Thorax broadest across the hind border, where it is almost twice the breadth of the head; sides very slightly convex. Elytra much broader than the thorax, and more than twice its length; each with about nine impressed lines. Length of the body, 4 lines.

Fam. BUPRESTIDÆ. (Leach.)—Genus ANCYLOCHEIRA.
(Eschscholtz.)

Ancylochira ornata. N. S.

Aureo-viridis; capite thoraceque confertim punctatis stria longitudinali; elytris punctato lineatis cupreo bivittatis; abdomine subtus fasciis auratis apice cupreo.

Bright golden green. Head and thorax thickly punctured, with an impressed longitudinal line. Elytra with deeply impressed punctured lines, with a purplish tinge on each side in front, full four times the length of the thorax. Abdomen beneath with a short gilded band on the fore border of each segment; tip cupreous. Length of the body, 9 lines.

The cupreous stripes on the elytra of this species distinguish it from *A. aurulenta*, and from *A. decora*.

Fam. ELATERIDÆ. (Leach.)—Genus ADELOCERA.
(Latr.)

Adelocera vetusta. N. S.

Nigra, confertim et subtiliter punctata, squamis cinereis ex parte tecta; thorace postice impresso margine bis inciso, angulis posticis subproductis; elytris substriatis.

Black, dull, thickly and minutely punctured, mostly covered with cinereous scales; these are mostly confluent, but are here and there isolated, so that various parts of the surface are uncovered. Thorax with a broad shallow excavation in the hinder disk; the margin with two shallow excavations on each side; hind angles

slightly produced. Elytra with slight and indistinct striæ, more than twice the length of the thorax. Length of the body, 8 lines.

Genus ATHOUS. (Eschscholtz.)

Athous quadrivittatus. N. S.

Niger; capite thorace confertissime et subtilissime punctatis; thorace pectoreque rufescente bivittatis; thoracis angulis posticis attenuatis acutis; elytris luteis punctato striatis, suturis piceis, tibiis tarsisque piceis.

Black, shining. Head and thorax very minutely and thickly punctured. Thorax and pectus with a broad reddish stripe on each side; hind angles produced into two acute spines. Elytra dull luteous, more than twice the length of the thorax; each with nine distinct regular punctured striæ; sutures piceous, except towards the base; tibiæ and tarsi piceous. Length of the body, 7 lines.

Genus LIMONIUS. (Eschscholtz.)

Limonius consimilis. N. S.

Niger, nitens, subtiliter punctatus; thoracis angulis elongatis acutis; elytrorum striis bene determinatis.

Black, shining, minutely punctured. Hind angles of the thorax elongate, acute. Elytra with the usual distinct regular striæ, more than twice the length of the thorax. Length of the body, $3\frac{1}{2}$ lines.

Genus DIACANTHUS. (Latr.)

Diacanthus semimetallicus. N. S.

Niger; capite thoraceque confertissime et subtilissime punctatis; thorace linea media impressa, angulis posticis

productis, sulcatis, acutis; elytris æneo-nigris striatis subtilissime rugulosis, basi subsulcatis.

Black. Head and thorax dull, extremely thickly and minutely punctured. Thorax with a slight impressed middle line; hind angles produced into two acute furrowed spines. Elytra æneous black, shining, extremely minutely rugulose, with many regular distinct striæ, full twice the length of the thorax; each elytron with a slight excavation in the disk at the base. Length of the body, 8 lines.

Fam. TELLIDÆ. (Leach.)—Genus CLERUS. (Geoffrey.)

Clerus sobrius. N. S.

Cupreo niger, nitens, aspere punctatus; capite thoraceque cinereo pilosis; elytris fascia cinerea lata incisa.

Cupreous black, shining, thinly and coarsely punctured. Head and thorax with cinereous hairs. Elytra with a broad cinereous middle band, which is narrower on each side, and is notched in front and behind. Length of the body, 5 lines.

This species is very different from the Californian *C. holosericeus*.

Fam. BLAPSIDÆ. (Latr.)—Genus IPHTHINUS. (Dej.)

Iphthinus servilis. N. S.

Niger, confertissime et subtilissime punctatus; capite thoraceque obscuris; thoracis lateribus convexis non retusis, angulis acutis; elytrorum lineis e punctis elongatis.

Black, very thickly and minutely punctured. Head and thorax dull. Head with an indistinct transverse impressed line in front of the eyes. Thorax almost twice broader than the head; sides convex, not retuse; hind angles prominent, acute. Elytra slightly shining, subfusiform, broader than the thorax, and nearly thrice its length, with regular lines of elongated punctures. Length of the body, 11 lines.

Iphthinus servator. N. S.

Niger, confertissime et subtilissime punctatus; capite thoraceque obscuris; thoracis lateribus subconvexis, antice retusis, angulis posticis subproductis; elytris subnitentibus lineis et punctis elongatis.

Black, very thickly and minutely punctured. Head and thorax dull. Thorax much broader than the head; sides slightly convex, retuse in front; hind angles slightly prominent. Elytra subfusiform, slightly shining, broader than the thorax, and nearly thrice its length, with regular lines of elongated punctures. Length of the body, 11 lines.

This species hardly differs from the preceding one, with the exception of the structure of the thorax.

Iphthinus subligatus. N. S.

Niger, confertissime et subtilissime punctatus; capite thoraceque obscuris; thoracis lateribus convexis, angulis posticis productis acutis; elytris subnitentibus subtiliter punctato lineatis.

Black, very thickly and minutely punctured. Head and thorax dull. Thorax much broader than the head;

sides convex; hind angles prominent, acute. Elytra subfusiform, slightly shining, broader than the thorax, and nearly thrice its length, with regular rows of minute punctures. Length of the body, 11 lines.

This may be distinguished from the two preceding species by the more minute punctures on the lines of the elytra.

Genus ELEODES. (Eschscholtz.)

Eleodes subtuberculata. N. S.

Nigra, obscura; capite thoraceque confertim punctatis; thorace lateribus subrectis, angulis anticis acutis; elytris ellipticis, tuberculato-lineatis.

Black, dull. Head and thorax thickly punctured. Head with a transverse impressed line between the base of the antennæ; clypeus somewhat shining. Thorax somewhat broader than the head, harder, broader behind than in front; sides almost straight; fore angles acute. Elytra elliptical, with numerous lines of minute tubercles, almost twice broader than the thorax, and about thrice its length. Length of the body, $5\frac{1}{2}$ lines.

Eleodes convexicollis. N. S.

Nigra; capite thoraceque subtilissime punctatis; capite incisuris tribus anticis; thoracis lateribus anticis valde convexis; elytris longiovatis, punctato-striatis.

Black, rather dull. Head slightly excavated on the fore border and on each side in front of the base of the antennæ. Head and thorax very minutely punctured. Thorax very convex on each side before the middle.

Elytra elongate oval, with distinct punctured striæ, somewhat broader than the thorax, and more than thrice its length. Length of the body, 14 lines.

Eleodes binotata. N. S.

Nigra, subnitens; capite thoraceque subtilissime punctatis; thorace binotata, lateribus antice, convexis, angulis anticis productis acutis; elytris punctato-striatis.

Black, slightly shining. Head and thorax extremely minutely punctured. Thorax with a slight impression on each side of the middle of the disk; sides convex before the middle; fore angles prominent, acute. Elytra subfusiform, with slight punctured striæ, nearly four times the length of the thorax. Length of the body, 10 lines.

Eleodes conjuncta. N. S.

Nigra, sat obscura, *H. convexicollis* affinis; thoracis lateribus minus rotundatis, scutellos majori; elytris angustioribus; capite thoraceque subtilissime punctatis; thorace binotato.

Black, rather dull, like *H. convexicollis* in structure. Head and thorax very minutely punctured. Thorax with a shallow discal on each side hindward; sides less convex than those of *H. convexicollis*. Scutellum larger. Elytra narrower; their sides more linear. Length of the body, 13 lines.

Eleodes latiuscula. N. S.

Nigra lata, sat obscura; capite thoraceque confertim et subtiliter punctatis; thoracis lateribus anticis convexis;

elytris substriatis confertissime punctatis, lateribus convexis.

Black, broad, somewhat dull. Head and thorax thickly and minutely punctured. Head with an indistinct transverse impressed line in front of the eyes; clypeus somewhat shining. Thorax much broader than the head; sides convex in front. Elytra elliptical, very thickly punctured, with slight striæ, much broader than the thorax, and nearly thrice its length; sides convex. Length of the body, 9 lines.

Fam. HELOPIDÆ. (Steph.)—Genus HELOPS. (Fabr.)

Helops inclusus. N. S.

Niger, nitens, subtilissime punctatus; thoracis lateribus convexis; elytris subtilissime striatis.

Black, shining, very minutely punctured. Head with a distinct transverse furrow in front of the eyes. Thorax a little broader behind than in front, much broader than the head; sides convex. Elytra with several very finely striated lines, a little broader than the thorax, and more than twice its length. Length of the body, $3\frac{1}{2}$ lines.

Fam. CANTHARIDÆ. (Leach.)—Genus LYTTA. (Linn.)

Lytta immerita. N. S.

Nigra, cinereo-tomentosa, subtus cinereo-pubescent; elytris linea marginali tenui cana.

Black, with cinereous tomentum; underside with cinereous pubescence. Elytra with a slender hoary border. Length of the body, 5 lines.

Genus NEMOGNATHA. (Illiger.)*Nemognatha bicolor.* N. S.

Sublutea, subtilissime punctata; antennis, scutellos, pectore, abdomine, pedibusque nigris.

Dull, luteous, shining; very finely punctured. Mouth, antennæ, scutellum, pectus, abdomen, and legs black. Length of the body, $5\frac{1}{2}$ lines.

Fam. ATILABIDÆ. (Schönhorn.)—*Genus RHYNCHITES.*
(Herbst.)

Rhynchites congrua. N. S.

Nigricante cyanea, aspere punctata; rostro thoracis longitudine, thoracis lateribus convexis; elytris latis lateribus subconvexis.

Blackish blue, roughly punctured. Rostrum as long as the thorax, slightly dilated towards the tip. Thorax narrower in front; sides convex. Elytra much broader than the thorax, and about twice its length; sides slightly convex. Length of the body, 3 lines.

Fam. CERAMBYCIDÆ. (Kirby.)—*Genus EUTRYPANUS.*
(Dejean.)

Eutrypanus princeps. N. S.

Mas et Fœm.—Niger, punctatus, tomento cano et cervino varius; antennis canis nigro-annulatis; thorace fascia vittisque duabus canis, guttis duabus, anticis pallide cervinis; elytris fusco et cervino variis, fasciis

quatuor dentatis incisibus canis. *Mas.*—Antennis corpore quadruplo longioribus. *Fem.*—Antennis corpore plus duplo longioribus, oviductu.

Male and Female.—Black, roughly punctured; varied with hoary and with fawn-coloured tomentum. Antennæ hoary, with black rings. Thorax with the hoary hue forming a stripe on each side, and a slender curved band, in front of which there are two pale fawn coloured dots. Elytra with four irregular dentate and notched hoary bands; intermediate spaces partly brown or fawn colour. Length of the body, 10 lines. *Male.*—Antennæ four times the length of the body. *Female.*—Antennæ more than twice the length of the body exclusive of the ovipositor. Ovipositor much more than half the length of the body.

Fam. LEPTURIDÆ. (Stephens.)—*Genus* TYPOCERUS.
(Leconte.)

Typocerus cervinus. N. S.

Cervinus; capite thoraceque subtilissime punctatis; antennis corporis dimidio longioribus; thorace bidentato; elytris pallidioribus diffuse punctatis.

Female.—Fawn colour. Head, thorax, antennæ and femora darker than the elytra. Head and thorax very minutely punctured. Antennæ more than half the length of the body. Thorax with one longitudinal and two transverse impressions, armed on each side with a short stout obtuse tooth. Elytra rather largely punctured. Length of the body, 12 lines.

Genus TOXOTUS. (Serville.)*Toxotus perductor.* N. S.

Niger; capite guttis duabus fulvis; elytris fulvis nigro trifasciatis fascia; 1^a guttulari; 2^a interrupta; 3^a lata; fasciis duabus ventralibus fulvis; pedibus fulvis; genubus tarsisque nigris; femoribus tibiisque posticis apice nigris.

Black, rather dull. Head tawny beneath, and with a tawny dot on each side at the base of the antennæ. Pectus with a broad triangular tawny stripe on each side. Elytra tawny, with three black bands; first band very incomplete, consisting of four elongated dots; second band interrupted near the suture; third broader than the second, extending nearly to the tip, which is reddish tawny. Abdomen extending a little beyond the elytra; first and second segments beneath with tawny bands, which extend along the hind borders of the segments, and are dilated in the middle. Legs tawny; knees and tarsi black; hind femora and hind tibiæ with black tips. Length of the body, 8 lines.

Fam. CLYTHRIDÆ. (Kirby.)—*Genus CLYTHRA.*
(Laichart.)

Clythra bisignata. N. S.

Obscure cyanea, nitens; antennis serratis; elytris punctato lineatis, macula basali rufescente.

Dark blue, shining. Head and thorax smooth. Antennæ serrated, not longer than the breadth of the head.

Elytra with lines of minute punctures; a reddish spot on each side at the base by the outer border, which is dilated near the base. Length of the body, 3 lines.

ORDER. NEUROPTERA.

Fam. SIALIDÆ. (Leach.)—Genus CHAULIODES. (Latr.)

Chauliodes disjunctus. N. S.

Fuscus, cinereo-pilosus; capite rufescente punctato, postice sulcato, plagis convexis nigris; mandibulis apice nigris; pedibus luridis; alis cinereis e maculis plurimis fuscis sublineatis; alis anticis plagis quinque, costalibus macularibus fuscis maculisque duabus basalibus nigris.

Brown, with cinereous hairs. Head dark reddish, thickly punctured; hind part with longitudinal furrows, which intersect some elongated convex black shining spaces. Mandibles with black tips. Prothorax elongated, broader than long, much narrower than the mesothorax. Legs lurid. Wings cinereous, with numerous brown spots and dots, which form incomplete transverse lines. Fore wings with some of the spots collected into five costal patches; two large black basal spots. Length of the body, 18 lines; of the wings, 48 lines.

This species is mostly allied to *C. californicus*, but may be distinguished by its larger size and by the difference in the markings.

LIST OF LEPIDOPTERA.

Fam. PAPILIONIDÆ.

Gen. PAPILIO.

Papilio.

- Turnus*. (Linn.)
rutulus. (Boisd.)
Zelicaon. (Boisd.)

Parnassius.

- clarius*. (Eversm.)

Pieris.

- Protodice*.
Menapia. (Felder.)

Colias.

- Chrysothome*.
Philodice.

Danaus.

- Archippus*.

Melitea.

- Pharos*. (Boisd.)
Anicia. (Doubl.)

Argynnis.

- Aphrodite*.
Callippe. (Boisd.)

Argynnis.

- Freyia*. (Var.)

Vanessa.

- Antiopa*. (Linn.)
Cardui. (Linn.)
Polychloros. (Linn.)
C. album. (Linn.)

Limenitis.

- Lorquinii*. (Boisd.)

Erebia.

- Medusa*.

Cenonympha.

- Davus*. (Fabr.)

Lycena.

- Pheres*. (Boisd.)

Tribe BOMBYCITES.

Fam. ARCTIIDÆ. (Leach.)

Gen. HALESIDOTA. (Hubn.)

Halesidota.

- **angulifera*. (Walk.)
 **roseata*. (Walk.)

ORDER. LEPIDOPTERA.

Fam. ARCTIIDÆ. (Leach.)—Genus HALESIDOTA.
(Hubner.)*Halesidota angulifera*. N. S.

Mas.—Pallide lutea; alis anticis fasciis quinque fusciscentibus obliquis angulosis; 1^a, indeterminata; 2^a et 3^a, qui connexis; 3^a et 4^a, qui postice conjunctis; 5^a, submarginali, lituris non nullis marginalibus fusciscentibus alis posticis albido-cinereis, venis pallide flavescentibus.

Male.—Pale luteous, paler beneath. Proboscis long.

Palpi porrect, pilose, rather slender, not extending beyond the front; third joint extremely short. Antennæ moderately pectinated. Abdomen extending much beyond the hind wings. Hind tibiæ with four rather short spurs. Fore wings with five oblique, irregular, zigzag, brownish bands—first band basal, very incomplete; second connected with the third in the middle; third and fourth united hindward; fifth submarginal; a few slight brownish marginal marks. Hind wings whitish cinereous; veins pale yellowish. Length of the body, 10 lines; of the wings, 24 lines.

Closely allied to *H. fulvo-flava*.

Halesidota? roseata. N. S.

Fem.—Roseosrufa; subtus flavo-pilosa; capitis fascia thoracisque strigis sex pallide flavis; abdomine roseo basi lanuginoso flavescente; alis anticis strigis basalibus pallide flavescens, fasciisque tribus exterioribus albidis macularibus perobliquis; alis posticis albido-cinereis subhyalinis.

Female.—Rosy red. Body densely clothed and partly pale yellow beneath. Head with a pale yellow band on the front. Palpi extremely short. Thorax with six longitudinal pale yellow streaks. Abdomen rosy, lanuginous, and partly pale yellow towards the base, extending much beyond the hind wings. Fore wings with some pale yellowish streaks towards the base, and with three exterior whitish macular very oblique bands; spots mostly cuneiform; costa straight; tips slightly acute; exterior border slightly convex, extremely oblique; first and second inferior veins contiguous at the base; third very near the second; fourth remote

from the third. Hind wings whitish cinereous, slightly hyaline; veins and fringe slightly yellowish. Length of the body, 7 lines; of the wings, 20 lines.

This species may form a new genus. It differs somewhat from *Halesidota* in the structure of the veins of the fore wings.

LIST OF DIPTERA.

CULICIDÆ. (Steph.)	GESTRIDÆ. (Leach.)
CULEX. (Linn.)	CUTEREBRÆ. (Clark.)
<i>Culex.</i>	<i>Cuterebra.</i>
* <i>pinguis.</i> (Walk.)	* <i>approximata.</i> (Walk.)
ASILIDÆ. (Leach.)	MUSCIDÆ. (Leach.)
LAPHRITES. (Walk.)	TACHINIDÆ. (Walk.)
LAPHRIA. (Fabr.)	EURIGASTER. (Macq.)
<i>Laphria.</i>	<i>Eurigaster.</i>
* <i>Columbia.</i> (Walk.)	* <i>septentrionalis.</i> (Walk.)

Order DIPTERA.

Fam. CULICIDÆ. (Steph.)—Genus CULEX. (Linn.)

Culex pinguis. N. S.

Fœm.—*Cervinus, robustus*; rostro apicem versus nigro; abdominis pube subaurata; pedibus robustis pallidioribus; alis cinereis, venis fulvis subpilosis.

Female.—Fawn-colour, stout. Proboscis much longer than the head, and the thorax black towards the tip. Abdomen with slightly gilded down. Legs stout, paler than the body; tarsi darker. Wings cinereous; veins tawny, slightly pilose; radial and subapical veins, with long forks. Length of the body, $3\frac{1}{2}$ lines; of the wings, 7 lines.

Fam. ASILIDÆ. (Leach.)—Sub-Fam. LAPHRITES.

(Wlk.)—Genus LAPHRIA. (Fabr.)

Laphria columbica. N. S.

Mas.—Subæneo-nigro; capite pilis subauratis densissime vestito; mystace e setis nigris; thorace nigro-piloso, fascia subaurato-pilosa; abdomine apicem versus subaurato piloso; femoribus posticis in-crassatis nigro-pilosis; tibiis posticis lividis apice nigris; alis nigricantibus areolarum discis cinereis.

Laphria Male.—Black, with a very slight æneous tinge. Head very thickly clothed with slightly gilded hairs; vertex and hind side with black hairs; mystax composed of black bristles. Thorax clothed with short black hairs; fore part with fawn-coloured pubescence; a band of slightly gilded hairs across the hind part of the scutum. Abdomen clothed towards the tip with slightly gilded hairs. Legs mostly clothed with slightly gilded hairs; hind femora incrassated with black hairs; hind tibiæ livid, and with slightly gilded hairs, except towards the tips. Wings blackish; discs of most of the areolets cinereous; veins and halteres black. Length of the body, 9 lines; of the wings, 16 lines.

This species has most resemblance to *L. posticata*, from which it may be distinguished by the pale hairs on the hind tibiæ.

Fam. CESTRIDÆ. (Leach.)—Genus CUTREBRA. (Clark.)

Cuterebra approximata. N. S.

Nigra; capite punctato; vertice linea glabra sulcata; thoracis tomento-cinereo; abdomine nigro-cyaneo; alis nigricantibus.

Black. Head minutely punctured above, slightly

rugulose towards the mouth; vertex with a slender, smooth, furrowed line. Thorax slightly covered with dark cinereous tomentum. Abdomen dark blue. Wings and alulæ blackish; veins black. Length of the body, 10 lines; of the wings, 18 lines.

Fam. MUSCIDÆ. (Latr.)—Sub-Fam. TACHINIDES. (Wlk.)

Genus EURIGASTER. (Macq.)

Eurigaster septentrionalis. N. S.

Fœm.—Nigra, setosa, latiuscula; capite argenteo-cinereo; vertice aurato; frontalibus atris; palpis rufescentibus; antennis aristæ dimidio incrassato; thorace vittis quinque cinereis; scutelli apice piceo; abdomine cinereo subtessellato; alis cinereis.

Female.—Black, setose, rather broad. Head silvery cinereous, gilded above; frontalia deep black, widening in front; facialia bordered with bristles along most of the length from the epistoma. Palpi reddish. Antennæ extending to the epistoma; third joint linear, rounded at the tip, full six times the length of the second; arista incrassated for half the length from the base. Thorax with five cinereous stripes; scutellum piceous at the tip. Abdomen slightly tessellated with cinereous, very bristly towards the tip, a little longer than the thorax. Wings cinereous; veins black; præbrachial vein forming an obtuse angle at its flexure, straight from thence to its tip.

Order HEMIPTERA.—Sub-Order HOMOPTERA.

Fam. CICADIDÆ. (Weitm.)—Genus CICADA. (Linn.)

Cicada occidentalis. N. S.

Fœm.—Nigra, subtus albido-tomentosa; facie et

prothorace testaceo marginatis; mesothorace lituris duabus cuneatis, lateribus margineque postice testaceis; segmentorum abdominalium marginibus posticis subtus luteis; femoribus tibiisque testaceo vittatis; alis vitreis basi laete rufis.

Female.—Black; underside with shining whitish tomentum. Head much narrower than the prothorax; transverse furrow in front testaceous; face transversely ridged on each side, with a testaceous border. Prothorax with four oblique furrows, which converge hindward; border testaceous; sides with slightly gilded pubescence, dilated and rounded hindward. Mesothorax with two V shaped testaceous marks, which extend from the fore border to the disk, and are indistinct except at the tips; sides and hind border testaceous. Abdomen thinly clothed with shining whitish pubescence; hind borders of the segments luteous on each side and beneath; dorsal opercula testaceous; sheaths of the ovipositor greenish. Femora and tibiae with testaceous stripes; fore femora incrassated, with two teeth on the underside. Wings vitreous, bright red at the base; veins black, greenish towards the base. Fore wings with a greenish costa; first and second transverse veins slanting outward; first parted by more than twice its length from the second; third and fourth slightly slanting inward. Length of the body, 12 lines; of the wings, 32 lines.

This species is smaller than *C. septemdecim*, to which it has much general resemblance.

LIST OF HYMENOPTERA.

FORMICIDÆ.

Formica.

herculanea. (L.)

integra. (Nyl.)

umbrata. (Nyl.)

nigra. (Linn.)

lævigata. (Nyl.)

MUTILLIDÆ.

Mutilla.

occidentalis. (L.)

*Fam. POMPILIDÆ. (Leach.)—Genus POMPILUS. (Fabr.)**Pompilus comparatus. N. S.*

Fœm.—Niger, subnitens, subtilissime punctatus; metathoracis linea impressa indistincta; abdomine rufo-glabro nitente, basi nigro, apicem versus nigricante; tibiis posticis tuberculatis; alis nigricantibus.

Female.—Black. Head and thorax thinly clothed with short black hairs, extremely minutely punctured, slightly shining. Metathorax well developed, with an indistinct impressed middle line. Abdomen red, smooth, shining, black at the base, blackish at the tip, a little longer than the thorax. Hind tibiæ tuberculate. Wings blackish. Length of the body, 7 lines; of the wings, 10 lines.

Pompilus pyrrhomelas. N. S.

Fœm.—Niger, subnitens, subtilissime punctatus; antennis robustis articulo 1° incrassato; metathorace transverse subruguloso linea impressa indistincta; segmentorum abdominalium marginibus posticis subglabris; tibiis posticis subtuberculatis; alis ochraceis, basi nigricantibus, apice fusciscentibus.

Female.—Black, extremely minutely punctured, clothed with black hairs, slightly shining. Antennæ

stout, shorter than the thorax; first joint incrassated. Metathorax transversely and minutely rugulose, with an indistinct middle impressed line. Abdomen fusiform, a little longer than the thorax; hind borders of the segments almost smooth. Hind tibiæ slightly tuberculate. Wings ochraceous, blackish at the base, brownish at the tips. Length of the body, 11 lines; of the wings, 16 lines.

LIST OF SPHEGIDÆ.

Anamopbila. (Kirby.)
luctuosa. (St. Farg.)
Pelopæus. (Latr.)
architectus.

APIDÆ.

Andrena.
vicina.
victima.
perplexa.
nivalis.
Osmia.
simillima.

Apathus.
insularis. (Sm.)
Bombus.
vinatus.
vagans.
**flavifrons.* (Smith.)
californicus.

TENTHREDINIDÆ.

Sirex.
**varipes.* (Walk.)
albicornis. (Fabr.)
Chrysis.
**smaragdicolor.* (Walk.)

Order HYMENOPTERA.

Fam. UROCIDÆ. (Leach.)—Genus SIREX. (Linn.)

Sirex varipes.

Fœm.—Nigricante cyaneus; antennis nigris; abdomine purpurascente cyaneo, apice impresso; oviductus vaginis abdominis dimidio brevioribus; pedibus rufis; tibiis supra nigris; alis cinereis.

Female.—Blackish blue, clothed with black hairs. Antennæ black. Abdomen purplish blue, with a nearly circular excavation at its tip. Sheaths of the ovipositor

black, less than half the length of the abdomen. Legs red; conæ black; tibiæ black above. Wings cinereous; veins black. Length of the body, 10 lines; of the wings, 18 lines.

Fam. APIDÆ.—Genus BOMBUS.

Bombus flavifrons. N. S.

Hirsutus, ater; capite, thorace, abdomenisque fascia tenuis flavis; alis nigricantibus; ano nigro.

Female.—Length, $8\frac{1}{2}$ lines. Clothed with black pubescence. The face and vertex have a pale yellow pubescence; that on the underside of the head is black. The anterior portion of the thorax before the insertion of the wings covered with pale yellow pubescence; also a narrow band of the same colour on the fourth segment of the abdomen; the wings blackish brown.

This species closely resembles *Bombus californicus*; from that species it differs in having darker wings, in the face and vertex being clothed with pale yellow pubescence, and in having a much narrower band on the abdomen.

Fam. CHRYSIDIDÆ. (Leach.)—Genus CHRYSIS. (Linn.)

Chrysis smaragdicolor. N. S.

Smaragdina, aspere punctata; antennis viridibus, apices versus nigris; abdominis segmenti 2ⁱ margine postico subglabro, 3ⁱ margine postico subruguloso, 4^o brevissimo nondentato; tarsis nigris; alis nigricantibus, postice cinereis.

Emerald green, thickly and somewhat coarsely punctured. Antennæ black, bright green towards the base. Abdomen more finely punctured than the thorax; second segment more finely punctured than the first, almost smooth and with purplish blue reflections along its hind border; hind border of the third segment slightly rugulose; fourth segment very short, not dentate. Tarsi black. Wings blackish, cinereous hindward; veins black. Length of the body, 7 lines; of the wings, 9 lines.

ARACHNIDÆ.

Nephila plumipes. (Koch.)

List, with descriptions of New Species of Annelides from Vancouver Island.

I have described the parasite in the keyhole limpet, *Lepidonotus lordi*, nov. sp., and where I found it, in Vol. II.

Lepidonotus insignis. (Baird.) N. S.

This is a very fine species of the genus *Lepidonotus*. It is rather more than three inches long, and is nearly half an inch in breadth exclusive of the setæ of the feet. On the upper surface the body is of a whitish colour, marbled with black. The sides, which are covered by the elytra, are white, and a broad line runs down the centre of the dorsum, throughout its whole length. The feet are encircled with fine black circular lines. The elytra, eighteen pairs in number, are oval, white, with black dots on the outer sides and centre, and they are marked

with a black semicircular patch on the inner edge. They do not overlap each other except near the head. On the body of the animal they are wide apart, leaving the centre of the back exposed. The proboscis is large and wrinkled, and the jaws are of a reddish-brown colour. The antennæ are five in number, the central one being nearly three times as long as the external pair, and of a pure white colour; the internal and external pairs white, tinged with black. The feet are very prominent, strong, rounded, conical, and armed with seven or eight stout brown bristles. The second branch is extremely small, and sends off two or three very small white setæ. The superior cirrus is tolerably long and sharp-pointed; it is pedunculated, the peduncle being stout, conical, and of a deep black colour. The inferior cirrus is short, conical, and sharp-pointed. The last segment of the body is terminated by two tolerably stout but not long cirri.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Lepidonotus Lordi. (Baird.) N. S.

This species is about three inches long, and rather more than one-third of an inch in diameter at the broadest part of the body. It tapers gradually from the head to the tail, which is only about one-eighth of an inch broad. The colour is of a light brown, a broad line of a much darker brown running along the whole length of the centre of the back. On the surface a groove runs down the centre of the body throughout its entire length. The elytra are 35 pairs in number, thin, membranous, and of a light brown colour. The two first overlap each other slightly in the middle; but for the

rest of its length the centre of the back is uncovered. The antennæ are five in number; the central one short, of much the same length as the internal ones; the two external ones the longest, white, with a bright black ring round the upper part, but leaving the point white, which is acute at the apex. The feet are tolerably stout, and the two divisions are both furnished with sharp but curved pointed bristles. The superior cirri are white, and of a moderate length; the inferior ones being short. — *Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Lepidonotus Grubei. (Baird.) N. S.

This species is about 2 inches long and $\frac{1}{2}$ an inch broad. The body underneath is of a uniform brown colour; above it is whitish, mottled with black. The elytra are 18 pairs in number, nearly round, rough with small tubercles, edged by a slightly raised margin, and mottled with black and white. They do not meet each other in the centre, but leave a portion of the back uncovered. The superior cirri are rather long, blunt pointed, pedunculated, marked with a black spot at the base, where they issue from the peduncle, and are ringed with black a little distance from the extremity. The inferior cirri are short and acute pointed. The feet are broad, and the bristles of both branches are stout, of a bright brown colour, and toothed on one edge near the extremity. The antennæ are five in number, and are all short, and nearly of equal length. — *Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Lepidonotus fragilis. (Baird.) N. S.

This species, owing to its brittle character, is in too bad a state to describe accurately. It is about $2\frac{1}{2}$ or 3 inches long, and is rather narrow. The scales or elytra appear to be very thin and membranous; but as they are deciduous it is difficult to ascertain the number, especially as the worm is broken into several pieces. The superior cirri are stout and club-shaped at the tip. There appear to be no ventral cirri on the feet, and the superior cirri become nearly obsolete on the lower half of the body.

It was found by Mr. Lord, adhering to a star-fish; 'but,' he says, 'it is next to impossible to obtain one perfect, as they break themselves to pieces on the slightest touch, or however carefully killed.' In this respect it resembles a species of Annelide belonging to the group of vermiform Aphrodisians, described by Risso, as occurring in the Mediterranean under the name of *Eumolpe fragilis*.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Nereis foliata. (Baird.) N. S.

This Nereid is of a dark grey colour above, and of a lighter hue underneath, somewhat iridescent. It is 15 inches in length, and at the broadest part is about $\frac{1}{2}$ an inch in breadth. It tapers gradually towards the tail, which terminates in two short, blunt, caudal styles. The first or occipital segment of the body is about twice the length of the second. The tentacular cirri are unequal, and vary in length; in the largest and best developed specimen the longest are only about

as long as the first two segments; while in another specimen nearly of the same size they are nearly equal in length to the first four segments, and in one or two small specimens not a third the length of the two just named. These cirri are equal in length to at least eleven of the first segments of the body. The shorter ones are only about half the length of the first segment of the body. The feet are well developed, the superior branchial appendages are large and in the form of a leaf, giving the animal at first sight the appearance of a species of *Phyllodon*. The antennæ are shorter than the palpi, which are strong and conical in shape.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

This species approaches very nearly to *Nereis virens* from Newfoundland (*vide* Middendorf, *Sibirische Reise* Anulos 6, tab. i., figs. 2-6).

Nereis bicanaliculata. (Baird.) N. S.

This is rather a small species, about 2 inches long, and $2\frac{1}{2}$ lines in breadth. It is of a dull white colour, and is remarkable for having a channel running down both the dorsal and ventral sides. The channel on the dorsal surface is rather deep, commencing from the eleventh ring, and continues to the tail; the channel itself is quite smooth, the divisions or rings of the body not showing on its surface. On the ventral surface the channel shows marks of the divisions or rings into which the body is divided. The head is small, the antennæ about equal in length to the palpi, and the tentacular cirri are equal to about five or six rings of the body. The upper portion of the body is rounded,

and not channelled; and the tail terminates in a round blunt knob without caudal filaments. The feet are rather small, but are rendered unusually distinct from the peculiar manner in which the rings or divisions of the body are interrupted by the channel running along the centre of the body. It tapers very gradually, and almost imperceptibly for some time, from the head to the tail.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Glycera corrugata. (Baird.) N. S.

This annelide is about 4 inches in length, exclusive of the proboscis, which, when exerted, is $\frac{1}{4}$ ths of an inch long, and is about 3 lines in breadth; the proboscis is 4 lines at its greatest diameter. The head is rather short and conical, and strongly ringed. The antennæ are somewhat broad. The feet are broad, composed of two lobes, and are destitute of branchial filaments. The bristles are jointed, and the setæ straight and sharp. The segments of the body are very numerous, composed of a double ring, the one on which the feet are set being the narrower of the two, and raised; while the whole surface of the body, especially on the upper side, is densely, though not very strongly, corrugated throughout its whole length. The proboscis is densely scabrous, and covered with very short dark-coloured bristles. The body tapers to a narrow point posteriorly, and terminates in a loosely-connected short lobe, armed at the extremity with a slightly-curved, horny, sharp-pointed claw.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Sabellaria saxicava. (Baird.) N. S.

This worm lives in the rock. The tube in which it lodges is solitary, and is evidently hollowed out of the solid (though not a very hard) rock by itself, and appears to be quite round. The thoracic portion of the body is round, the abdominal flattened, with an impressed line running down through its whole length. The head is surmounted by an opercular disc, composed of two rows of stout dissimilar bristles (*paleæ*). The inner row consists of about ten stout cylindrical sharp-pointed bristles of a dark-horn colour, gradually increasing in size from the dorsal margin towards the ventral. The outer row consists of about eighteen bristles, not so stout, flattened, and finely denticulated on both sides for about half the length. The post-occipital segment of the body is long, of a dark colour, somewhat wrinkled, and marked with three or four fleshy tubercles on each side. The thoracic feet are three pairs, and are broad but short. As only one specimen was found, it was thought unadvisable to dissect the whole worm out, in consequence of which the extremity has not been seen. I am unable to say whether it terminates in a caudal appendage or not.

The length of the exposed portion of the worm is $1\frac{1}{2}$ inch, the breadth about 2 lines; probably the part enclosed in the tube may be of about equal length.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

*List of Fishes collected in the Salt and Fresh Waters
of Vancouver Island and British Columbia.*

SALMONIDÆ.

Salmo.

purpuratus. (Pallas.)
spectabilis. (Grd.)

Fario.

stellatus. (Girard.)

Fario Lordii. (Nov. Sp.)

(Günther: Fishes, Vol. VI. p. 148.)

Scales minute. Head and body rather compressed; the height of the head equals the length of the head, and is two-ninths of the total (without caudal); the length of the head is one-half of the distance between the snout and the vertical from the origin of the dorsal fin. Snout very obtuse, scarcely longer than the diameter of the eye, which is three-fourths of the width of the interorbital space. The lower jaw is a little shorter than the upper; maxillary of moderate width, scarcely reaching to the vertical from the margin of the orbit. Teeth of moderate strength; those along the medium line of the hyoid are very small. Præoperculum with a very distinct lower limb. Fins rather small; the length of the pectoral is less than that of the head (without snout), or one-half of the distance of its root from the ventrals; caudal fin slightly emarginate. Back and sides reddish olive; sides with numerous round light-coloured spots. Belly whitish, powdered with reddish olive; paired fins and anal colourless; caudal immaculate. Pyloric appendages very long and wide.

'This is one of the smallest species of charr, both our specimens having the abdomen filled with mature ova.'

This very interesting little charr's habits would have been described, when speaking of the Salmonidæ in Vol. I., had it been named as a new species in time. The specimens in the British Museum collection I caught with an artificial fly in a small stream that flows down the west slope of the Cascades, near the Skaget flat, to join the Fraser at Fort Hope.

Salmo.

- paucidens. (Richardson.)
- quinnat (Richardson) (or Semeetlek).
- Scouleri.
- paucidens (or slzoin).
- Gairdneri (or cha-cha-lool).
- lycaodon (or Keasoo, Ekewan, and Kutch-kutch).

Thaleichthys.

- pacificus. (Grd.)

Coregonus.

- quadrilateralis.

Gasterosteus.

- serratus.
- Pugetti.
- concinus.
- spinachia.

Chirus.

- hexagrammus.
- decagrammus.
- constellatus.

Sebastes.

- paucispinis.
- melanops.

Agonus.

- acipenserinus.

Cottus.

- polyacanthocephalus.
- bubalis.

Centridermichthys.

- maculosus.
- parvus.
- gulosus.
- armatus.
- globiceps.

Platichthys.

- rugosus.

Pleuronectes.

- stellatus.
- umbrosus.
- bilineatus.
- hippoglossus?

digrammus (Günther: nov. sp., Brit. Mus. Cat. Fishes).

Vide Vol. I. Flat-fishes.

Pleuronichthys.

- guttulatus. (Grd.)

Mulletta.

- cærulea.

Engraulis.

- mordax. (Grd.)

Syngnathus.

- arundinaceus. (Grd.)

Acipenser.

- transmontanus. Vide Vol. I. Sturgeon fishing.

Chimera.

- Colleii.

Acanthus.

- Suckleyi.

*Fam. EMBIOTOCIDÆ.**

(Günther: Fishes, Vol. IV. p. 245.)

Body compressed, elevated, or oblong, covered with cycloid scales. Lateral lines continuous. One dorsal fin, with a developed spinous process, and with a scaly sheath along the base, which is separated by a groove from the other scales; anal with three spines and numerous rays. Ventral and thoracic fins with one spine and five soft rays. Tusk in the jaws small; palate smooth. The lower pharyngeal bone triangular. Branchiostegals, five or six. Gills, four pseudo-branchiæ, well developed; air-bladder large, simple. Stomach without cæcal appendage; pyloric appendage, none. Viviparous. Vertebrae 17—20. (*Ditrema aggregatum*.)

Synopsis of Genera.

Dorsal spines . . . 7—11 . . .	1. DITREMA.
Dorsal spines . . . 16—18 . . .	2. HYSTEROCARPUS.

DITREMA.

Body compressed, elevated, covered with cycloid scales of moderate or rather small size; mouth rather small; teeth conical, in a single series. One dorsal fin, the spinous portion of which is less developed than the soft, and composed of seven to eleven spines; anal with three spines and numerous closely-set rays. Gills, four, with a cleft behind; pseudo-branchiæ well developed.

Ditrema.

Jacksoni.
laterale.
Temminckii.
vacca.
toxotes.

Ditréma.

Caryi.
aggregatum.
furcatum.
brevipinnes (Günther: nov.
sp. Fishes, Vol. IV.).

* Vide Viviparous Fishes, Vol. I.

Ditrema brevipinnes. (Sp. ch.)

The three posterior dorsal spines are the longest; a little shorter than the anterior rays. Scales on the cheeks in two series. The length of the body is one-third of the total length (without caudal). Jaws equal in length anteriorly; lips thin, the fold of the lower being interrupted in the middle. The maxillary does not quite extend to the anterior margin of the eye. Length, $7\frac{1}{2}$ inches. Head somewhat longer than high, its length being nearly one-fourth of the total (without caudal). The upper profile is somewhat concave above the eye. The diameter of the orbit equals the extent of the snout, and is two-sevenths of the length of the head; cleft of the mouth oblique; tusk rather small, in a single series. The scaly part of the cheek is narrower than the orbit. The dorsal commences vertically above the root of the ventral; the first spine is very short, the three following increase in length; the three last, being longest, of nearly equal length, half as long as the head; the anterior rays a little longer than the last spine. The anal fin commences below the seventh dorsal ray, and extends further backwards than the dorsal fin, its spines being very distinct; caudal emarginate. Back, dark greenish olive; belly, silvery.

I obtained this little species in Esquimalt Harbour, but it has the same range and general distribution as the others. Vide Vol. I.

Ditrema.

minimum.
arcuatum.
megalops.

Ditrema.

Agassizii.
anale.
rhodoterum.

Gen. HYSTEROCARPUS.

Body compressed; oblong; covered with scales of moderate size. Mouth rather small; teeth conical, in a single series. One dorsal fin with from sixteen to eighteen spines; anal, with three spines and numerous rays. Intestinal tract short, with two circumvolutions.

*Hysterocharpus.**Traskii.*

Cyclopterus orbis. (Nov. Sp.: Günther.)*

(D. 7-19. A. 9.)

The head and body form one orbicular mass, terminating posteriorly in the narrow, short tail. The plates with which the skin is covered are very rough, tubercular, and conically elevated in the centre. A series of large plates runs along the upper orbital edge to the side of the back; two series of smaller ones run along the middle of the interorbital space, and along the base of the dorsal fins. Other large plates occupy the middle of the sides and the lateral part of the belly; the plates on the side of the head, before the pectoral, are only half as large as those described, and those on the tail are smaller. The mouth is transverse, not extending on to the side of the head, and one-half the greatest width of the interorbital space. The ventral disk is shorter than the head, subcircular, entire, and surrounded by fifteen flat papillæ. The caudal fin is of moderate length, rounded, and composed of nine simple rays. Vent nearer to the ventral disk than to the anal fin.

* British Museum Catalogue of Fishes.

Found attached to the bones of a large whale that was washed into Esquimalt Harbour, Vancouver Island.

ECHINEIS. (Species not made out.)

I found a number of these curious sucking fish (with the sucking disk on the top of their heads) attached to the turtle ~~we~~ caught with a hook and line. Vide Vol. I., 'The Voyage.'

GADUS. (Species not determined.)

List of Shells taken on the eastern side of Vancouver Island, dredged in ten fathoms water, and collected from rocks between tide marks.

MURICIDÆ.

Fusus orpheus. (Gould.) Esquimalt Harbour, 8 to 10 fathoms.
— *sitkensis.* (Gould.) Esquimalt Harbour, between tide marks.
Columbella gausapata. (Gould.) Esquimalt Harbour, 10 fathoms.
Nassa mendica. (Gould.) Esquimalt Harbour, 8 fathoms.

Chrysodomus tabulatus. (Baird: Nov. Sp.)

Testa fusiformi, aspera, confertim lirata, liris inæqualibus, minute squamatis; anfractibus sex seu septem, superne concavoangulatis seu canaliculatis, ultimo magno, trientes duos longitudinis testæ adæquante, et antrorsum in canalem flexuosum desinente, saturis distinctis; labro interno super columellam inflecto, umbilicum tegente.

Only one specimen of this species was collected, and it had for some time been the abode of a hermit-crab.

It is of a perfectly fusiform shape, and the upper parts of the whirls next to the suture are flattened and hollowed out into broad channels. The surface is encircled with numerous, close-set, raised striæ, which are of unequal size, every fourth one being larger than any of the intermediate ones, and all roughened by numerous small scales. The whirls are six or seven in number (the upper ones being unfortunately broken off), and rapidly increase in size, the last being two-thirds the length of the whole shell. The columella is covered with a turned-over plate of the inner lip, the umbilicus being partially concealed by it. The lower canal is of considerable length, and is bent to one side. The mouth appears to be rather small in proportion to the size of the shell. When taken, it was inhabited by a species of *Pagurus*, and, as is customary with shells similarly inhabited, was considerably injured by its parasitic tenant. Long. 3 inches; lat. $1\frac{1}{2}$ inch.—*Hab.* Esquimalt Harbour. (*Brit. Mus.*)

BUCCINIDÆ.

Murex lactuca. (Esch.) Esquimalt Harbour, between tide marks; very abundant.

Vitularia aspera. (Baird: Nov. Sp.)

Vit.—Testa fusiformi, purpurea, scabra, elongata, longitudinaliter plicato-costata, transversim lirata, liris crebris et minutissime squamatis; anfractibus sex, ultimo trientes duos longitudinis testæ adequante, in canalem rectum, longiusculum, apertum, desinente; columella planulata, fauce albida; labro externo intus

dentato, extus serrato; operculo oblongo, nucleo in margine externo sito.

This shell partakes much of the character of a species of *Murex*; but the oblong operculum, with its nucleus situated on the external edge towards the middle, places it among the *Buccinidæ*. It is of a purple colour; and the surface of the shell is rough, with numerous small scales on the raised striae which encircle it. The longitudinal plaits or varices are about ten in number, and are least distinct on the last whirl. The mouth is ovate, and the canal of moderate length and straight. Long. 1 inch; lat. $\frac{1}{2}$ inch.—*Hub.* Esquimalt Harbour. (*Brit. Mus.*)

PYRAMIDELLIDÆ.

Murex foliatus. (Lamk.) Esquimalt Harbour, between tide marks.

Purpura emarginata. (Reeve.) Esquimalt Harbour, between tide marks.

Chemnitzia vancouverensis. (Baird: Nov. Sp.)

Testa elongato-turrita, cylindrica, longitudinaliter oblique forte costata; anfractibus novem, ultimo superne indistincte costato, infra lævigato; apertura parva, rotundato-ovato; suturis impressis.

This shell is peculiarly ribbed. The eight upper whirls are strongly and somewhat obliquely ribbed; but on the last, which is the largest, the ribs are indistinct on the upper half, and on the lower half disappear altogether. The interstices between the ribs, which in the penultimate whirl are about sixteen in number, appear smooth. The sutures are deep and well marked. The mouth is rather small, and is somewhat rounded-

ovate. In consequence of its having been in the crop of a duck, the surface of the shell is somewhat eroded, and the apex is broken off. Long. $\frac{1}{4}$ inch.—*Hab.* Esquimalt Harbour. (*Brit. Mus.*)—‘Taken from the crop of a pin-tail duck.’—*J. K. Lord.*

LITTORINIDÆ.

Littorina scutulata. (Gould.) Esquimalt Harbour, between tide marks; abundant.

— *sitkana.* (Phil.) Esquimalt Harbour, between tide marks; abundant.

Amnicola Hindsii. (Baird: Nov. Sp.)

Testa retusa, solidula, viridi-olivacea, minute longitudinaliter undulato-striata, transversim obscure lirata, apice erosa; anfractibus quatuor, ultimo prope medium retuse-carinato, ad suturas canaliculato, suturis impressis; columella albida; apertura cærulescente.

This species resembles somewhat the *Paludina seminalis* of Hinds, but it differs in contour, being bluntly carinate round the middle of the last whirl, and in being channeled round the suture. The surface of the shell is distinctly marked with numerous flexuous striæ, the lines of growth, and near the sutures is rather indistinctly marked with circular striæ. I have named it after a good conchologist, who has described several shells from the West Coast of America, and who obtained the specimens of his shell from the Rio Sacramento, California. Long., largest specimens, nearly $\frac{1}{2}$ inch; lat. rather more than $\frac{1}{3}$ inch.—*Hab.* River Kootanie, and stream at the foot of the Rocky Mountains, British Columbia. (*Brit. Mus.*)

LACUNIDÆ.

Lacuna carinata. (Gould.) Esquimalt Harbour, 10 fathoms of water.

MELANIADÆ.

Melania sulicula. (Gould.) From swift streams west of the Cascades.

CERITHIADÆ.

Potamides filiosus. (Gould.) Macaulay's Point, at extreme low water.

CALYPTRÆIDÆ.

Crepidula excavata. (Brod.) Esquimalt Harbour, at low water.

— *exuviata.* (Nutt.) Esquimalt Harbour, in holes bored by *Saxicava* between tide marks.

— *unguiformis.* (Lamk.) Esquimalt Harbour, and attached to stones between tide marks.

— *nummaria.* (Gould.) Esquimalt Harbour, and attached to stones between tide marks.

— *adunca.* (Sowerby.) Esquimalt Harbour, and attached to stones between tide marks.

Calyptraea fastigiata. (Gould.) Esquimalt Harbour, 8 to 10 fathoms water.

TROCHIDÆ.

Zisiphinus annulatus. (Gray.) Macaulay's Point, low water.

— *ligatus.* (Gould.)

Trochus pollygo. (Martin.) Esquimalt Harbour, collected by Dr. Lyall.

Margarita costellata. (Sowerby.) Macaulay's Point, low water.

FISSURELLIDÆ.

Fissurella crutitia. (Gould.) Macaulay's Point, low water. Many of the fish contained a parasitic worm, *Lepidonotus Lordii.* Vide Vol. I.

TECTURIDÆ.

Tectura leucophea. (Nutt.) Between tide marks.

— *persona.* (Esch.)

— *patina.* (Esch.)

— *testudinali.* (Nutt.)

— *instabilis.* (Gould.)

— *mitella.* (Menke.)

— *scutum.* (Esch.)

— *Cumingii.* (Reeve.)

Scurria mitra. (Esch.)

} All common along the coast, on
rocks between tide marks.

CHITONIDÆ.

Ischnochiton levigatus. (Fat.)

— *dentiens.* (Gould.) Esquimalt Harbour, dredged 10 fathoms.

Chiton Wosnessenskii. (Midd.)

— *muscosus.* (Gould.) Rocks between tide marks.

— *stelleri.* (Gould.) Macaulay's Point.

Tonicia lineata. (Gray.) Dredged 10 fathoms.

Katharina tunicata. (Gray.) Rocks between tide marks.

BULLINIDÆ.

Bullina (Tornatina) eximia. (Nov. Sp.)

Testa cylindracea, viridi-lutescente, striata; striis minutis, confertis, undulatis; spira concava, excavata; apertura longa, ad basin effusa; labro acuto; columella prope basin subito arcuata.

Two or three specimens of this pretty species of *Bullina* were dredged, with the animals alive, in 12 fathoms water; and several others were taken out of the stomach of a pin-tail duck shot in the harbour. The shell is cylindrical, and minutely striated with numerous flexuous lines. The spire is very short and concavely

excavated; while the aperture is of considerable length, and the columella at the base suddenly arched. Long. $\frac{1}{2}$ inch.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus.*)

HELICIDÆ.

- Helix Townsendiana.* (Lea.) Sumass Prairie, British Columbia.
 — *fidelis.* (Gray.) Common east and west of the Cascades; occurs 6,000 feet above sea level.
 — *Dupetit-Thouarsæ.* (Desch.) Sumass Prairie and Vancouver Island.
 — *villicata.* (Forbes.) Sumass Prairie and Vancouver Island.
 — *Columbiana.* (Lea.) Banks of the Fraser River.

SUCCINIDÆ.

Succinea rusticata. (Gould.) Sumass Prairie.

Succinea Hawkinsii. (Baird: Nov. Sp.)

Testa elongato-obovata, tenui, pellucida, nitida, undulato-striata, rubella, intus margaritacea, spira acuta; anfractibus quatuor, convexis, ultimo duos trientes longitudinis testæ adequante, sutura impressa, apertura ovali, inferne effusa.

This shell is of an elegant form, and of a pinkish colour, with the interior of a pearly lustre. It is smooth and shining, but marked with waved striæ of lines of growth. It resembles very much in figure the *Succinea Pfeifferi* of Europe, but is of a still more elegant shape, and of a brighter hue.

I have named it after Lieut.-Col. Hawkins, R. E., Commissioner of the British North-American Boundary Commission. Long. $\frac{3}{4}$ inch; lat. $\frac{1}{2}$ inch.—*Hab.* Lake Osoyoos, British Columbia. (*Brit. Mus.*)

LIMNÆIDÆ.

Lymnea stagnalis. (Linn.) Lake Osoyoos, replaced west of the Cascades by *L. Sumassii*.

Lymnea Sumassii. (Baird: Nov. Sp.)

Testa elongata, attenuata, cornea, fragili; anfractibus sex, ultimo cæteris duplo majore; apertura mediocri; columella forte plicata; superficie externa, sub lente, creberrime et minutissime decussata.

This species of *Limnæa* approaches *L. elodes* of Say, but is more elongated, more fragile, and has the columella very strongly plicated. The surface of the shell, when seen under a lens of moderate power, is finely decussately striated. It is of a horny colour, and is of an elongated shape. Long., largest, $1\frac{1}{6}$ inch; lat. $\frac{1}{2}$ inch. —*Hab.* Sumass Prairie, Fraser River, British Columbia. (*Brit. Mus.*)

Lymnea megasoma. (Say.) Lake Osoyoos, and streams west of Rocky Mountains.

Physa heterostropha. (Say.) Found only east of Cascades.

Physa Lordi. (Baird: Nov. Sp.)

Testa tenui, majuscula, cornea, tumida, gibbosa, apertura magna; labro acuto, linea alba seu fusca externe notato; superficie externa minutissime decussata; anfractibus sex, duobus primis minutis, nigro tinctis, ultimo tumido, cæteris quadruplo majore.

This species is one of the largest of the genus, and is much swollen and gibbous. The outer lip is generally marked with a streak of brown edged with white, which

mark is left in those specimens which are of older growth, leaving a white callous-looking line of growth edged with brown, nearly in the centre of the last whirl, which is very large, being about four times the size of all the others put together. The two upper whirls, which are very small, are of a black colour. The surface of the shell is finely decussately striated.

The *Physa heterostropha* of Say abounds in the Sumass Prairie, on the Fraser River; but its place seems to be taken on the higher ground towards the Rocky Mountains by the *Ph. Lordi*. Long: from $\frac{3}{4}$ to 1 inch; lat. from $\frac{1}{2}$ to $\frac{3}{4}$ inch.—*Hab.* Lake Osoyoos, British Columbia. (*Brit. Mus.*)

Planorbis trivolvis. (Say.) Common west of the Cascades, replaced by *P. corpulentis* east.
— *corpulentis*. Abundant in the Osoyoos lakes.

Ancylus Kootaniensis. (Baird: Nov. Sp.)

Testa ovata, cinerea, concentric striata, vertice antico, obtuso; intus nitida.

The shell is of an ovate form, and is concentrically striated, though the striæ only appear on the lower two-thirds of its surface, the apex being smooth and shining. Internally the shell is shining and somewhat pearly. Long. $\frac{1}{4}$ inch; lat. $\frac{1}{4}$ inch.—*Hab.* Rivers Kootanie and Spokane. (*Brit. Mus.*)

VENERIDÆ.

Chione Lordi. (Baird: Nov. Sp.)

Testa minuta, ovato-trigona, nitida, concentric transversim sulculata, umbonibus prominulis, nitidis-

simis, lunula nulla, extus lutescente seu albid-olivacea, intus alba, marginibus tenuissime crenulatis; sinu pallii brevi, obtusa.

This shell was taken in considerable numbers from the crop of a pin-tail duck, shot in the harbour of Esquimalt, Vancouver Island.

It is a small species, of an ovate-triangular shape, a smooth shining appearance, and a light olive colour. The surface is concentrically marked with slight grooves. The beaks are prominent and very shining. Internally the surface is white, the margins of the shell very finely crenulate, and the pallial impression short and blunt. Long. nearly $\frac{1}{4}$ inch; lat. rather less than $\frac{1}{4}$ inch.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus.*)

Venus rigida. (Gould.) Vancouver Island, mud between tide marks.
Saxidomus squalidus. (Desh.) Vancouver Island, mud between tide marks.

Sphaerium (Cyclas) tumidum. (Baird: Nov. Sp.)

Testa ovato-trigona, tumida, olivacea, conferte transversim concentrice forte costata; umbonibus prominentibus, necnon erosis; interne cærulescente; margine ventrali rotundato.

This shell is of a tumid, swollen figure, and of an ovate-trigonal shape. The colour externally is dark olive, and it is strongly ribbed concentrically. The beaks are prominent, and frequently eroded. The inner surface is of a bluish tint. The ventral or lower margin is rounded. Long. $\frac{1}{2}$ inch; lat. rather more than $\frac{1}{4}$ inch.—*Hab.* Sumass Prairie, Fraser River, British Columbia. (*Brit. Mus.*)

Sphærium (Cyclas) Spokani. (Baird: Nov. Sp.)

Testa rotundato-ovata, cornea concentrice transversim conferte minute striata, nitida, sublente obsolete punctata; umbonibus rotundatis, obtusis; interne albida; margine ventrali rotundato.

This shell is smaller than the preceding, more rounded, and with more obtuse beaks. The striæ or riblets are much less distinct; the colour is pale horny externally, and white internally. It has a shining appearance; but when examined by the lens, the surface is seen to be indistinctly punctate. The specimens taken from the Spokan River are much larger than those collected in the Kootanie. Long. rather less than $\frac{1}{2}$ inch; lat. rather more than $\frac{1}{2}$ inch.—*Hab.* Rivers Spokan and Kootanie. (*Brit. Mus.*)

TELLINIDÆ.

Tellina nasuta. (Conrad.) Esquimalt Harbour, mud between tide marks.

Lyonsia saxicola. (Baird: Nov. Sp.)

Testa ovato-oblonga, medio gibba, tenui, fragili, antice producta, clausa, postice compressiuscula, hiantē; umbonibus magnis, incurvis; epidermide olivacea, striata; margine dorsali rectiusculo, margine ventrali flexuoso, hiantē.

This species is the largest of the genus that has yet been discovered. It is of an ovate-oblong shape, gibbous in the centre, produced anteriorly, compressed posteriorly and gaping. The beaks are large and incurved: it is covered with an olive-coloured epider-

mis, which is striated transversely. The ventral margin is gaping and flexuous. This species resembles considerably the *L. navicula* of Adams and Reeve ('Zoology of the Voyage of the Samarang'), from the Sooloo Sea, and might be taken for a very large specimen of it, and, indeed, is considered to be so by Mr. Adams himself, who informed me he had taken identically the same species, as to size, &c., from the seas of Japan. Besides the size, habitat, and place of abode, this species differs from *L. navicula* in the form of the anterior extremity of the shell and the more gaping ventral margin. Owing to the peculiar place of abode (holes in the rocks), it varies considerably in size and form; but in all the specimens which I have seen, ten in number, it does not vary in the produced anterior extremity. The striae seen on the surface of the epidermis do not appear to extend from it to the shell underneath. It lodges always in holes in the rocks, from which it is very difficult to extract it, without breaking it; for it would appear to take up its abode in a small hole, enlarging it as it increases in size itself. The substance of the shell, without being very thin, is exceedingly brittle; and few specimens were brought over without being cracked across in various places, apparently in the act of drying. The ossicle covering the front of the internal cartilage is strong and well developed. The length of a moderate-sized specimen is about 3 inches, of a large specimen $4\frac{1}{2}$ inches; the breadth from the beaks to the ventral margin is about 2 inches and $2\frac{1}{2}$ inches. —*Hab.* Holes in rocks in Esquimalt Harbour, Vancouver Island. (*Brit. Mus.*)

CARDIIDÆ.

Cardium corbis. (Mart.) Esquimalt Harbour, dug from sand between tide marks; grows to a great size, and is an important article of Indian diet.

Leda fossa. (Baird: Nov. Sp.)

Testa elongata, ovali, antice multo brevior, rotundata, postice elongata, in rostrum subacutum producta, transversim undulato-costata, in latere antico fossa transversa notata; umbonibus prominulis, margine ventrali rotundato; intus lævi; epidermide tenui, lutescente, nitida induta.

This little shell is of an elongate form, much reduced posteriorly; and near the anterior extremity it is marked by a longitudinal depression or pit, upon which the ribs are nearly obsolete. Long. rather more than $\frac{1}{2}$ inch; lat. rather less than $\frac{1}{2}$ inch.—*Hab.* Esquimalt Harbour, Vancouver Island; dredged in from 10 to 15 fathoms water, by Dr. Lyall, of H.M.S. 'Plumper.' (*Brit Mus.*)

PHOLADIDÆ.

Teredo fimbriata. (Jeff.) Nai-ni-mo Harbour; very destructive to wood piles. Some pieces of wood in British Museum are honeycombed, and only under water 4 months.

SAXICAVIDÆ.

Saxicava rugosa. (Lamak.) Esquimalt Harbour, between tide marks.

Crassatella Esquimalti. (Baird: Nov. Sp.)

Testa parva, cordato-trigona, crassiuscula, olivacea, transversim undato-plicata, antice producto-rotundata,

postice subtruncata, margine ventrali rotundata, umbonibus prominulis, lunula longe caudata.

This species approaches very much in sculpture to the *C. corrugata* of Adams and Reeve ('Zoology of the Voyage of the Samarang'), from the Sooloo Sea, but differs very much in shape. The peculiar undulate plications are chiefly discernible near the umbones, the plicæ or ribs on the lower third of the shell being plain. The beaks are nearly central and prominent; the anterior extremity is somewhat produced, while posteriorly the shell is somewhat truncate. Long. rather more than $\frac{1}{3}$ inch; lat. nearly $\frac{1}{2}$ inch.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus.*)

UNIONIDÆ.

Anodonta cognata. (Gould.) Very abundant east and west of the Cascades.

Alasmadonta angulata. (Say.) Columbia River, Fort Colville, not strictly in British Columbia.

MYTILIDÆ.

Mytilus trossulus. (Gould.) Abundant, rocks between tide marks.

— *californiensis.* (Conrad.) Abundant, grows to an immense size, sought as an article of diet by the Indians along the Vancouver Island coast.

Nucula lyalli. (Baird : Nov. Sp.)

Testa ovato-triangulari, tumida, crassa, umbonibus prominulis, antice brevior, subrostrata, postice declivi, elongata, margine ventrali rotundato, epidermide olivacea induta, longitudinaliter utrinque costata, costis fortibus, medio divaricatis; intus margaritacea; margine

ventrali subcostato; dentibus anticis ad numerum undecim, posticis novemdecim.

This very interesting species is the fourth of this peculiar divaricately ribbed group which has been discovered in a recent state. The three others are *Nucula divaricata* and *N. castrensis* of Hinds, and *N. mirabilis* of Adams and Reeve. This species approaches very nearly to the fossil species from the Crag, *N. cobboldia*, but differs from it in being less transversely ovate, in having the beaks more prominent, the posterior row of teeth in the hinge fewer in number (in *N. cobboldia* they are 22), and in the costations being stronger in proportion to the size of the shell, and much fewer in number. It was with some hesitation that I decided upon describing it as a new species; but these marks, the size, and the habitat all induce me to consider it as distinct. I have named it after Dr. Lyall, of H.M.S. 'Plumper,' who has sent us only one specimen. Long. rather more than $\frac{1}{2}$ inch; lat. rather more than $\frac{1}{2}$ inch. — *Hab.* Esquimalt Harbour, Vancouver Island; dredged by Dr. Lyall, H.M.S. 'Plumper,' in from 8 to 10 fathoms. (*Brit. Mus.*)

PECTENIDÆ.

Pecten hericius. (Gould.) Esquimalt Harbour, 8 to 10 fathoms water.
Hinnites giganteus. (Gray.) Rocks between tide marks.

OSTRIDÆ.

Ostrea edulis. (Lamk.) Abundant along the island and mainland coasts.
Placunanomia cipio. (Gray.) Rocks between tide marks.

List of Diatomaceæ from Gatherings in British Columbia and on the shores of Vancouver Island. Kindly classed for me by Dr. Wilson. (119 Species.)

Fam. i. *Eunotiæ.*

- Epithemia turgida.* Columbia River; Pend'Oreille River; Lake Osoyoos; Cow Creek.
 — *proboscidea.* Columbia River.
 — *granulata.* Columbia River; Pend'Oreille River; Lake Osoyoos.
 — *gibba.* Pend'Oreille River; Cow Creek; Lake Osoyoos.
 — *sorex.* Columbia River.
 — *argus.* Pend'Oreille River; Lake Osoyoos.
 — *ventricosa.* British Columbia.
Eunotia arcus. Tributary of Kootenay River; Tobacco River; Spokane River.
 — *arcus (var.)* Tributary of Moyee River; Pend'Oreille River.
Himantidium arcus. Columbia River.
 — *bidens.* British Columbia.

Fam. ii. *Meridiæ.*

- Meridion circulare.* Tributary of Kootenay; Tobacco River; Cow Creek.
 — *constrictum.* Pend'Oreille River.

Fam. iii. *Licmophoræ.*

- Podosphenia Ehrenbergii* m. 10 fathoms. Vancouver Island.

Fam. iv. *Fragillariæ.*

- Odontidium Harrisonii.* Pend'Oreille River; Cow Creek, tributary of Kootenay; Tobacco River.
 — *hyemale.* Tributary of Kootenay River; Moyee River; Tobacco River.
 — *mesodon.* Source of Tobacco River.
Nitzschia sigmoidea. Cow Creek.
 — *amphioxys.* Cow Creek.
 — *minutissima.* Tributary of Kootenay.
 — *angularis* m. Vancouver Island.
 — *sigma* m. 10 fathoms. Vancouver Island.

Fam. v. *Surirelleæ*.

- Synedra affinis m.* Shores of Vancouver Island.
Cymatopleura solea. Columbia River; Pend'Oreille River.
 — *elliptica.* Columbia River.
Surirella biseriata. Columbia River.
 — *splendida.* Columbia River.
 — *gemma m.* Vancouver Island.
Campylodiscus costatus. Columbia River.
 — *parrulus m.* Vancouver Island.
 — *striatus m.* Vancouver Island.

Fam. vi. *Striatelleæ*.

- Rhabdonema arcuatum m.* Shores of Vancouver Island, and at 8 fathoms.
Tabellaria fenestrata. Spokane River.
Grammatophora marina m. Shores of Vancouver Island.
 — *mexicana m.* Shores of Vancouver Island.
 — *serpentina m.* Shores of Vancouver Island.
 — *serpentina (var. β).* Smith *m.* Vancouver Island.
Gephyria media m. Vancouver Island.
Eupleuria pulchella m. Vancouver Island.

Fam. vii. *Melosireæ*.

- Cyclotella Dallasiana.* Columbia River.
 — *operculata.* Tributary of Kootenay River.
Hyalodiscus lævis m. Vancouver Island.
 — *subtilis m.* Shores of Vancouver Island.
Podosira hormoides m. Shores of Vancouver Island, and at 8 fathoms.
Melosira orichalcea. Columbia River; Pend'Oreille River; Lake
 Osoyoos.
 — *marina m.* Vancouver Island.
 — *nummuloides m.* Vancouver Island.
 — *varians.* Pend'Oreille River; Cow Creek; Spokane River.
 — *subflexilis.* Columbia River.

Fam. viii. *Coxinodisceæ*.

- Coxinodiscus radiatus m.* Shores of Vancouver Island.
 — *ovulus iridis m.* Vancouver Island.

Fam. viii. *Coxinodisceæ*—continued.

- Coxinodiscus subtilis* m. Shores of Vancouver Island.
Actinoeocylus undulatus m. Vancouver Island.
 — *subtilis* m. Vancouver Island.
Actinoptychus senarius m. Vancouver Island.
Arachnoidiscus Ehrenbergii m. Vancouver Island, at 8 fathoms.

Fam. ix. *Eupodisceæ*.

- Auliscus cœlatus* m. Vancouver Island.

Fam. x. *Biddulpheæ*.

- Biddulpheia aurita* m. Shores of Vancouver Island, and at 8 fathoms.
 — *tumida* m. Shores of Vancouver Island, and at 8 fathoms.
 — *lævis* m. Vancouver Island.
Isthmia nervosa m. Vancouver Island.

Fam. xi. *Angulifereæ*.

- Triceratium Monterayii* m. Vancouver Island.
Amphitetras antediluviana m. Vancouver Island.

Fam. xii. *Chatocereæ*.

- Chatoceros incurvum* m. Vancouver Island.

Fam. xiii. *Cononeideæ*.

- Cononeis placentula*. Columbia River; Pend'Oreille River; tributary of Kootenay.
 — *pediculus*. Tributary of Kootenay.
 — *Thwaitesii*. Columbia River.
 — *pseudomarginata* m. Shores of Vancouver Island, and at 10 fathoms.
 — *distans* m. Vancouver Island, at 10 fathoms.
 — *concentrica* m. Vancouver Island.
 — *scutellum* m. Vancouver Island.
 — *diaphana* m. Vancouver Island.
 — *splendida* m. Vancouver Island.
 — *disrupta* m. Vancouver Island.
 — *nigrescens* (Greville). New species. Vancouver Island.
 — *oregana* (Greville). New species. Vancouver Island.

Fam. xiv. *Achnauthææ*.

- Achnauthidium lanceolatum*. Pelouse; Cow Creek; tributary of Kootenay.
Achnauthes brevipes m. Shores of Vancouver Island, and at 8 fathoms.
 — *exilis*. Cow Creek.

Fam. xv. *Cymbellææ*.

- Cymbella maculata*. Tributary of Kootenay River.
 — *Ehrenbergii*. Columbia River.
Cononema cymbiforme. Kootenay River; Pend'Oreille River.
 — *lanceolatum*. Columbia River; Kootenay River; Spokane River; Lake Osoyoos.
 — *lanceolatum*, var. *cornutum*. Columbia River.
 — *cistula*. Columbia River.
Amphora ovalis. Columbia River; Pend'Oreille River; Cow Creek.
 — *ventricosa* m. Vancouver Island.

Fam. xvi. *Gomphonemææ*.

- Gomphonema marinum* m. Shores of Vancouver Island, and at 10 fathoms.
 — *dichotornum*. Tributary of Kootenay River; Spokane River.
 — *curvatum*. Tributary of Kootenay River.
 — *geminatum*. Columbia River; tributary of Kootenay River.
 — *capitatum*. Kootenay River.
 — *Herculaneum*. Columbia River; Spokane River; Cow Creek.
 — *acuminatum*. Pend'Oreille River.
 — *tenellum*. British Columbia.
 — *constrictum*. Lake Osoyoos.

Fam. xvii. *Naviculæææ*.

- Navicula dicephala*. Tributary of Kootenay River.
 — *rhomboides*. Tributary of Kootenay River; Columbia River; Moyee River.
 — *elliptica*. Tributary of Kootenay River; Lake Osoyoos; Pend'Oreille River.
 — *maxima*. Columbia River.
 — *gibberula*. Columbia River; Pend'Oreille River; Cow Creek.
 — *didyma* m. Shores of Vancouver Island, and at 8 fathoms.

Fam. xvii. *Naviculaceæ*—continued.

- Navicula* *crabro* *m.* Vancouver Island.
 — *leptogongyla*. Cow Creek.
 — *Smithii* *m.* Vancouver Island, at 10 fathoms.
 — *rhombica* *m.* Vancouver Island.
 — *varians*. Lake Osoyoos.
Stauroneis *pulchella* *m.* Shores of Vancouver Island, and at 10 fathoms.
 — *phœnicentron*. Source of Tobacco River.
 — *anceps*. Columbia River.
 — *gracilis*. Pend'Oreille River.
Pleurosigma *formosum* *m.* Vancouver Island, at 10 fathoms.
 — *speciosum* *m.* Vancouver Island.
 — *intermedium* *m.* Vancouver Island.
 — *naviculaceum* *m.* Vancouver Island.
 — *fasciola* *m.* Esquimalt Harbour.

Fam. xviii. *Actiniscææ*.

- Dictyocha* *gracilis* *m.* Shores of Vancouver Island, and at 8 fathoms.
 — *fibula* *m.* Shores of Vancouver Island.
Mesocena *elliptica* *m.* Vancouver Island.

THE END.

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